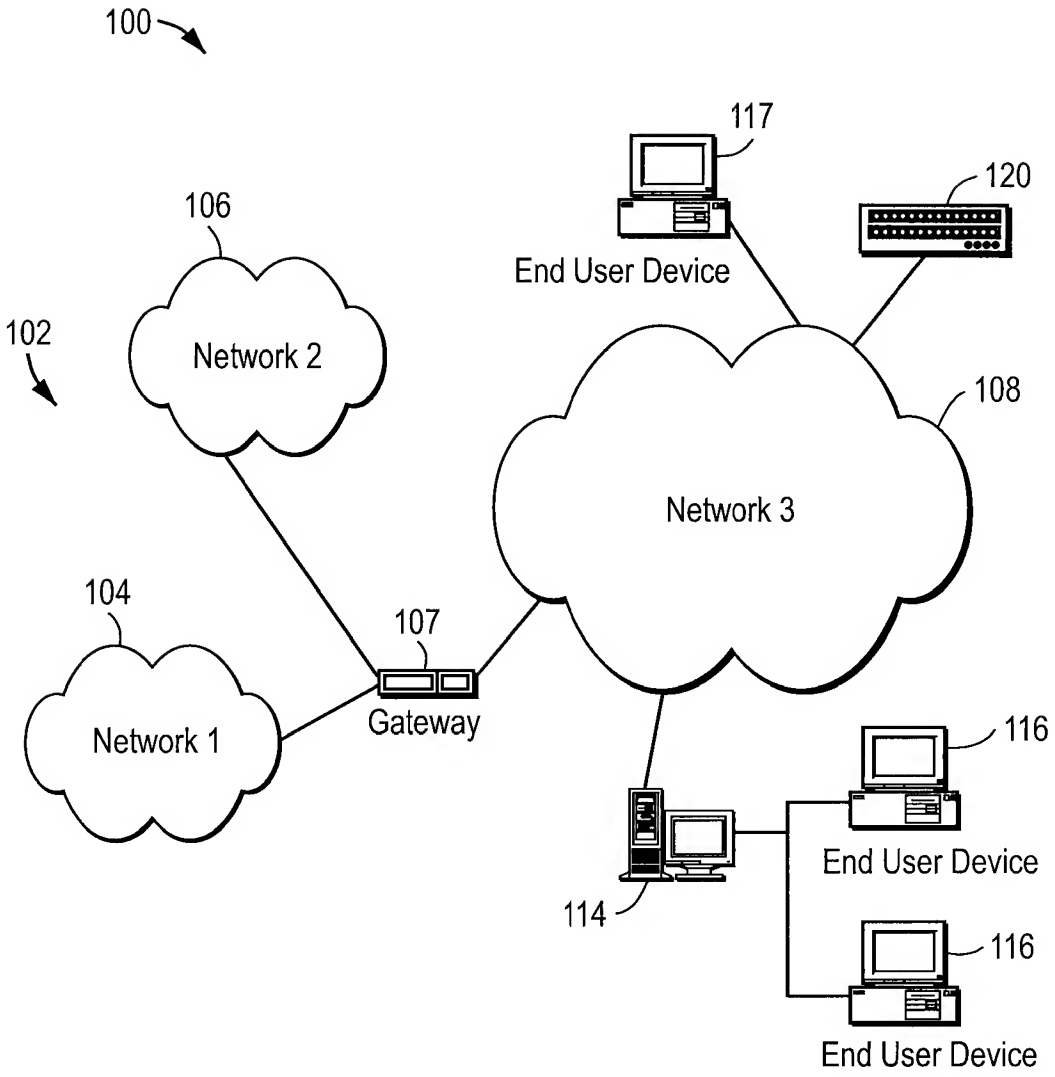
100
117
End User Device
120
106
102
Network 2
108
Network 3
104
107
Gateway
Network 1
116
End User Device
114
116
End User Device

FIG. 1

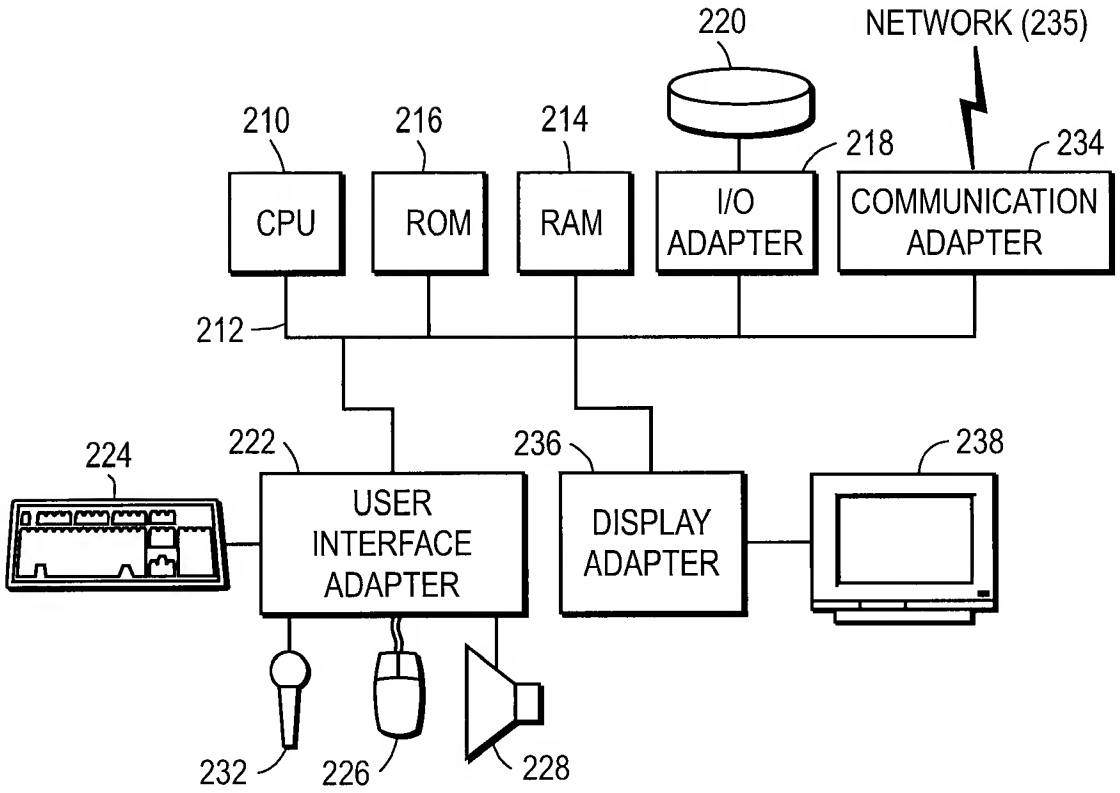
220
NETWORK (235)
210
216
214
218
234
CPU
ROM
RAM
I/O ADAPTER
COMMUNICATION ADAPTER
212
224
222
236
238
USER INTERFACE ADAPTER
DISPLAY ADAPTER
232
226
228

FIG. 2

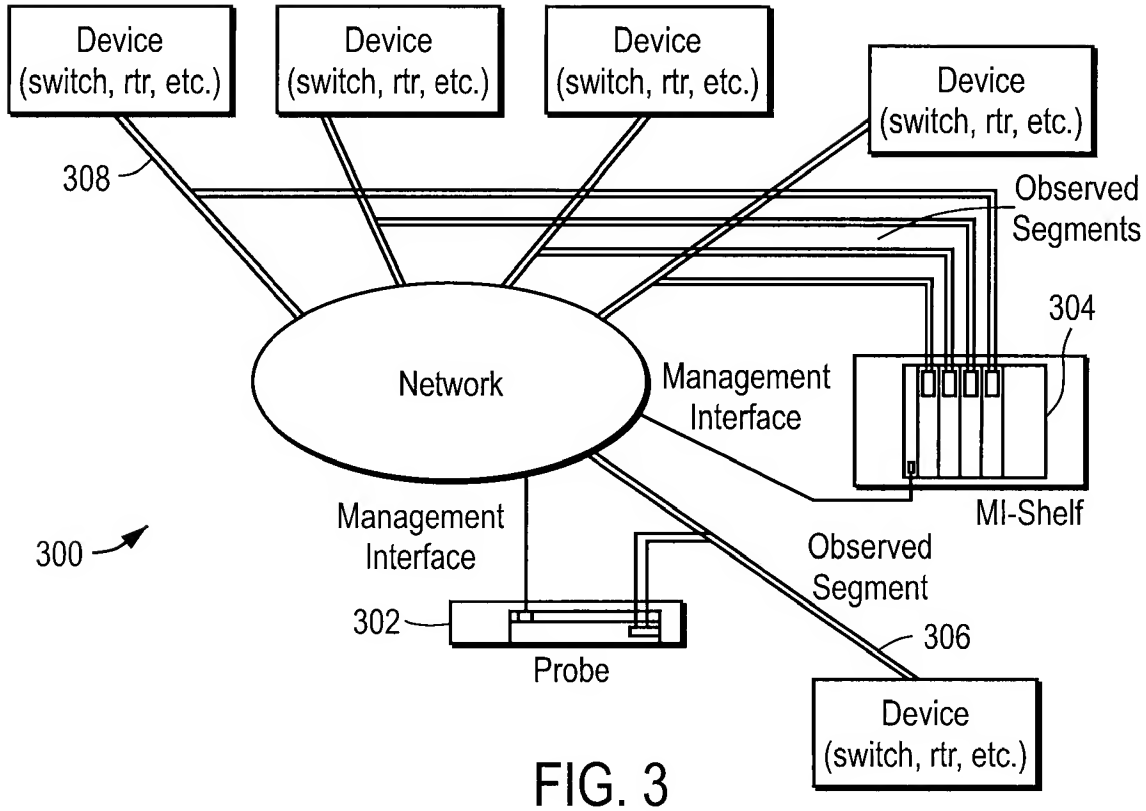
Device
(switch, rtr, etc.)
Device
(switch, rtr, etc.)
Device
(switch, rtr, etc.)
Device
(switch, rtr, etc.)
308
Observed
Segments
304
Network
Management
Interface
MI-Shelf
300
Management
Interface
Observed
Segment
302
306
Probe
Device
(switch, rtr, etc.)

FIG. 3

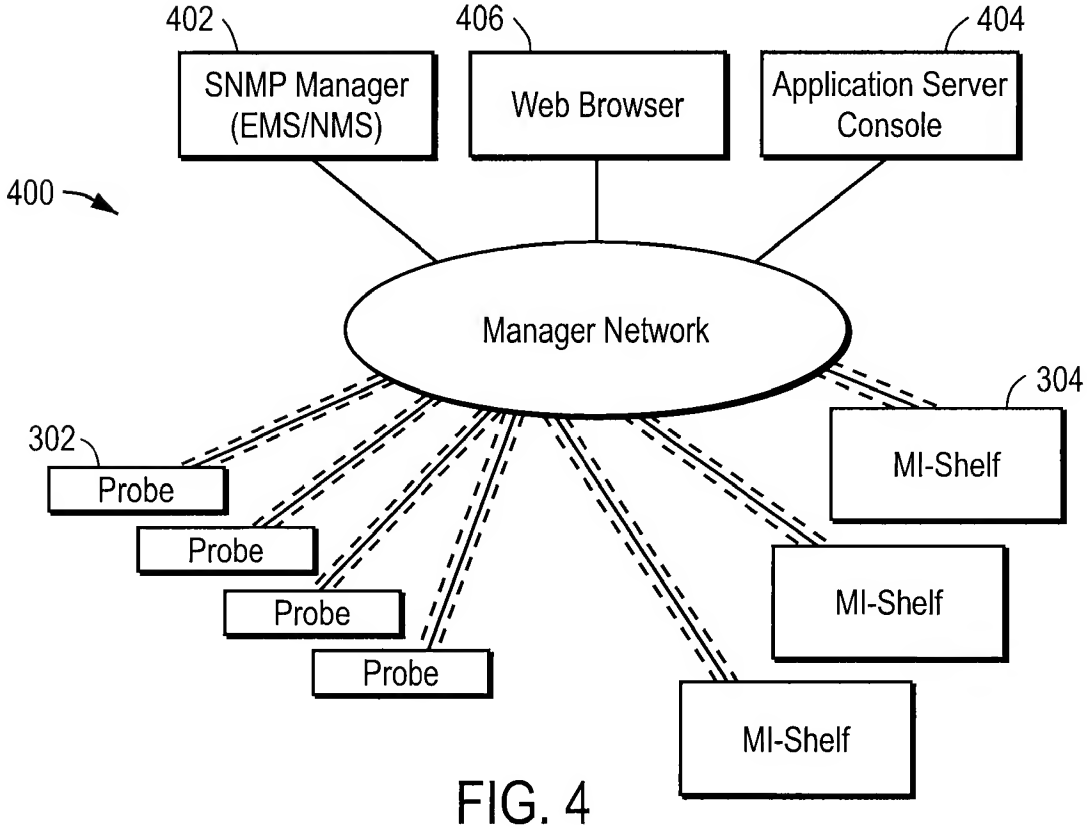
402
406
404
SNMP Manager
(EMS/NMS)
Web Browser
Application Server
Console
400
Manager Network
304
302
Probe
MI-Shelf
Probe
Probe
MI-Shelf
Probe
MI-Shelf

FIG. 4

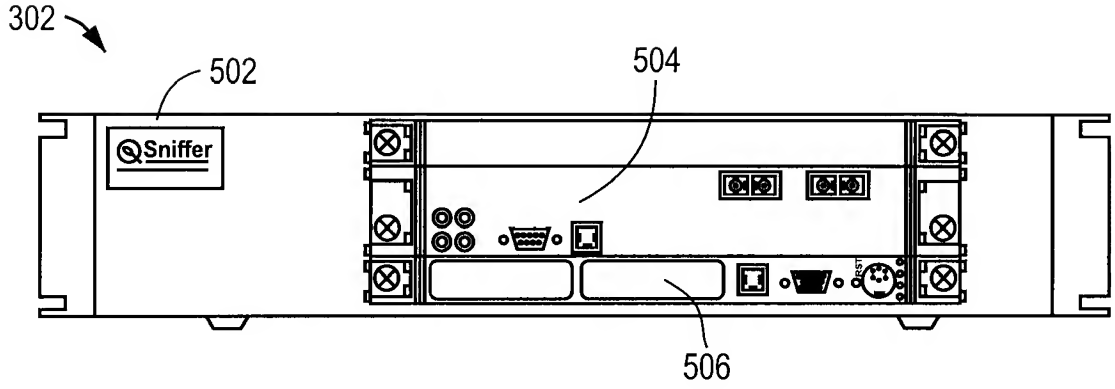
302
502
504
Sniffer
506

FIG. 5

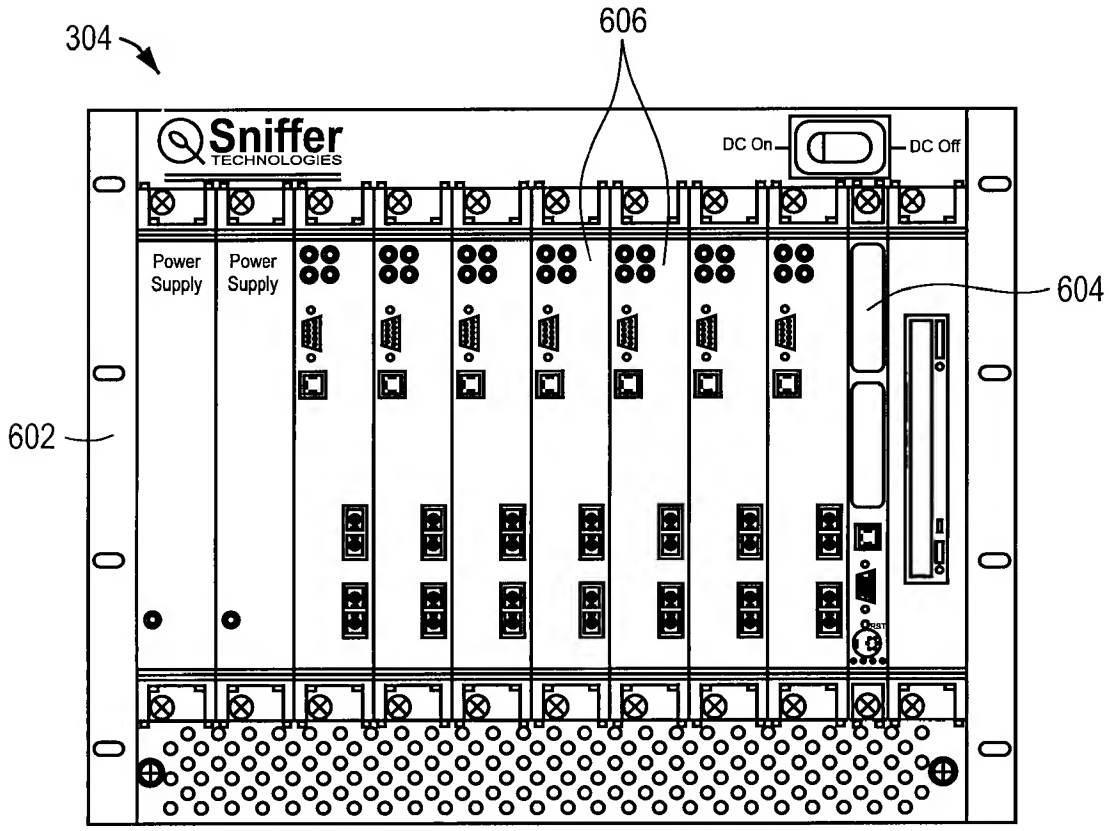
304
606
Sniffer
TECHNOLOGIES
DC On
DC Off
Power Supply
Power Supply
604
602

FIG. 6

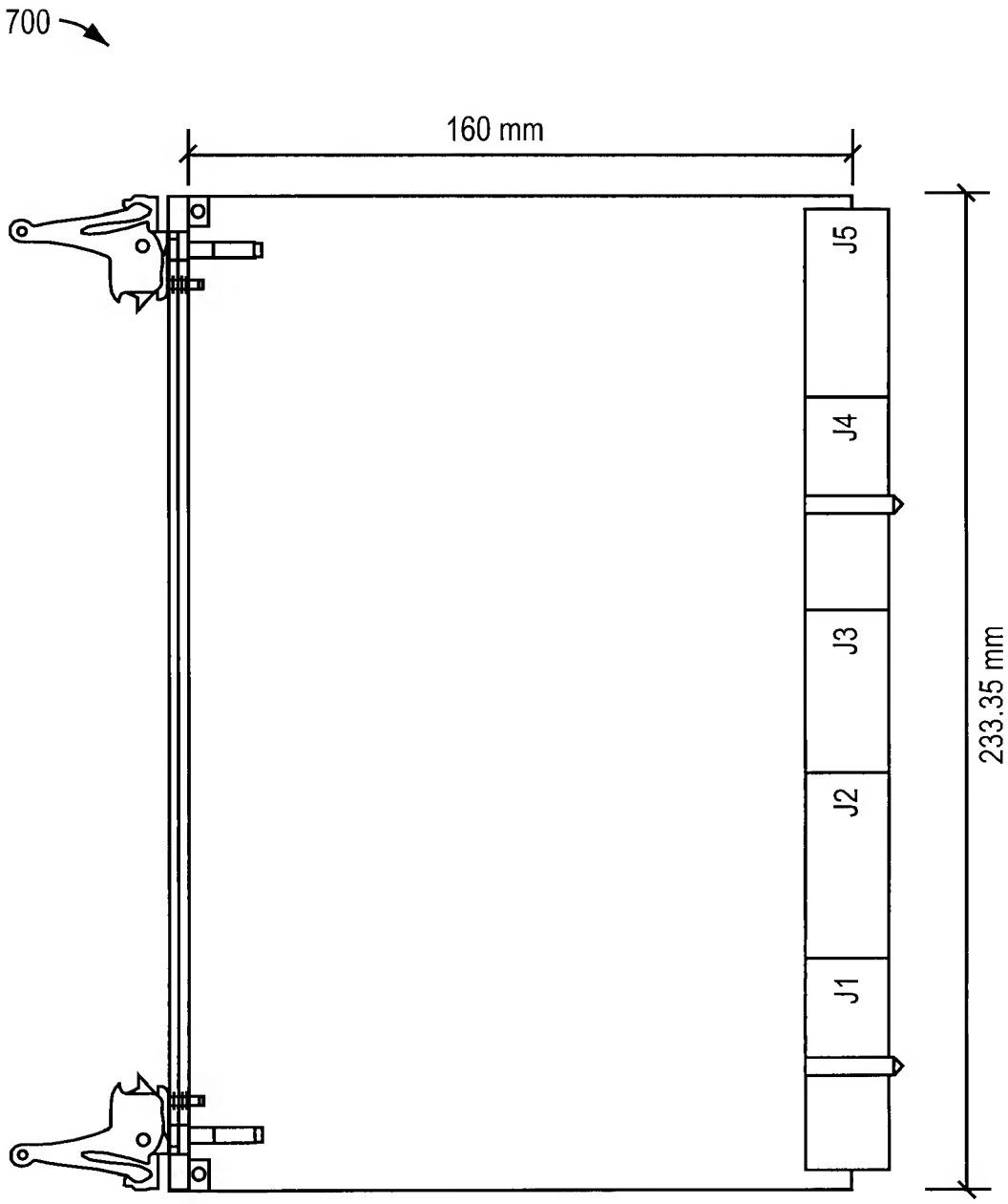

FIG. 7

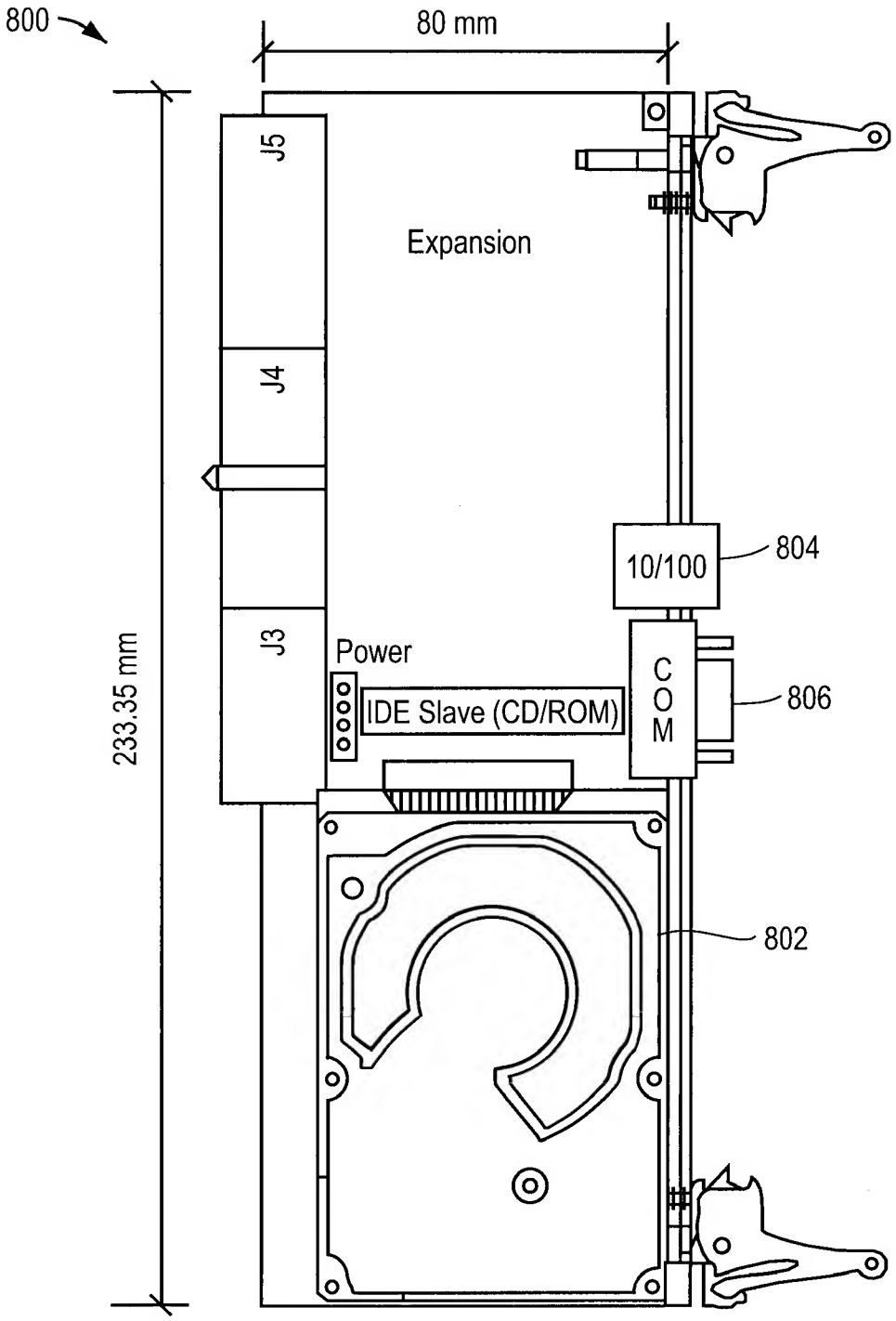
800
80 mm
233.35 mm
J5
J4
J3
Expansion
10/100
804
Power
IDE Slave (CD/ROM)
COM
806
802

FIG. 8

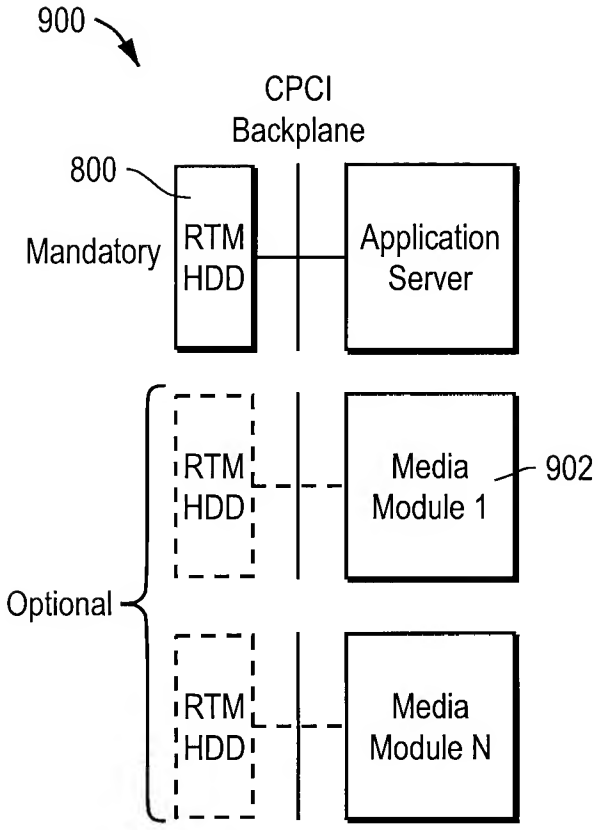
900
CPCI
Backplane
800
Mandatory
RTM
HDD
Application
Server
RTM
HDD
Media
Module 1
902
Optional
RTM
HDD
Media
Module N

FIG. 9A

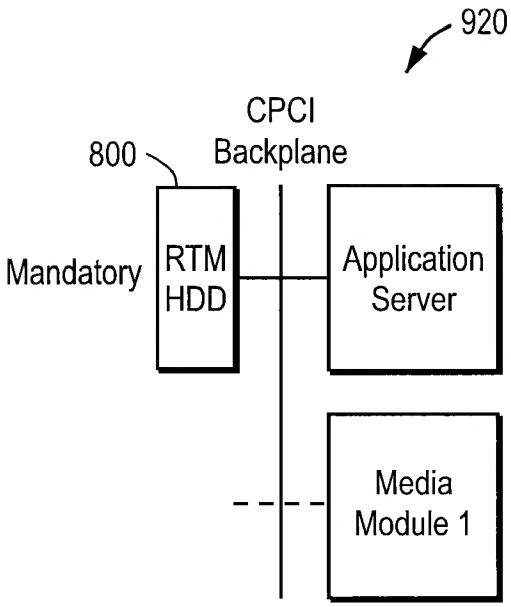
920
CPCI
Backplane
800
Mandatory
RTM
HDD
Application
Server
Media
Module 1

FIG. 9B

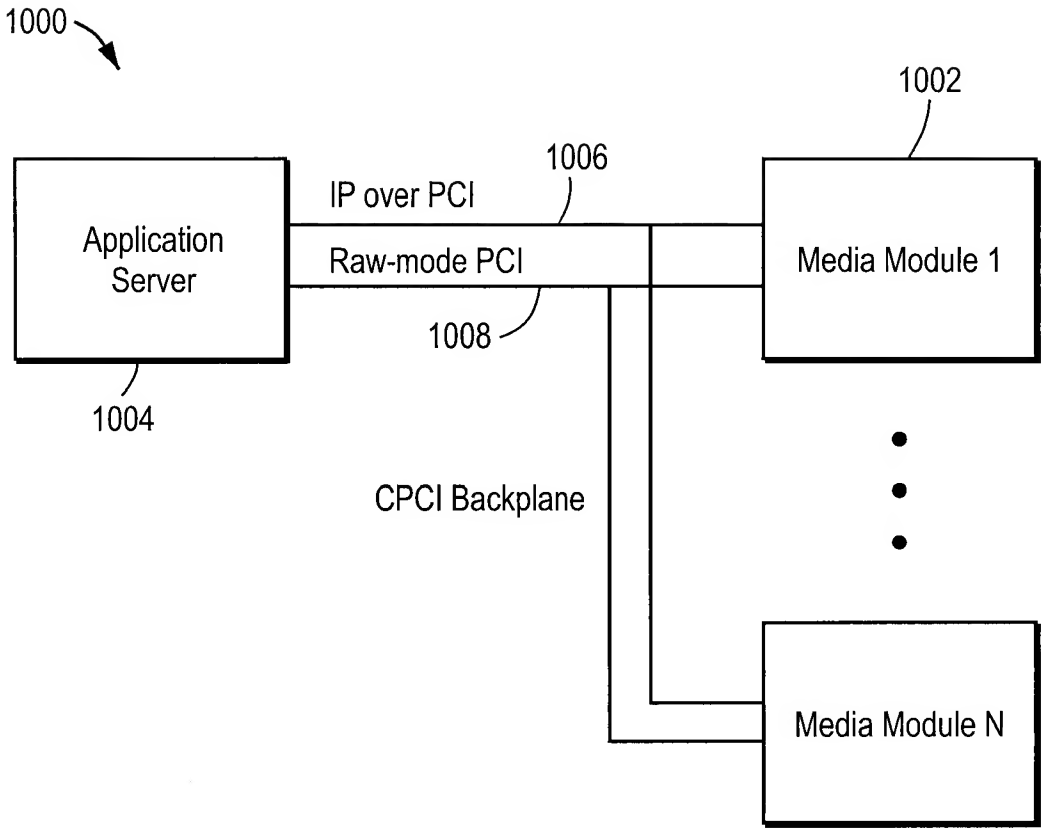
1000
1002
1006
IP over PCI
Application Server
Raw-mode PCI
Media Module 1
1008
1004
CPCI Backplane
Media Module N

FIG. 10

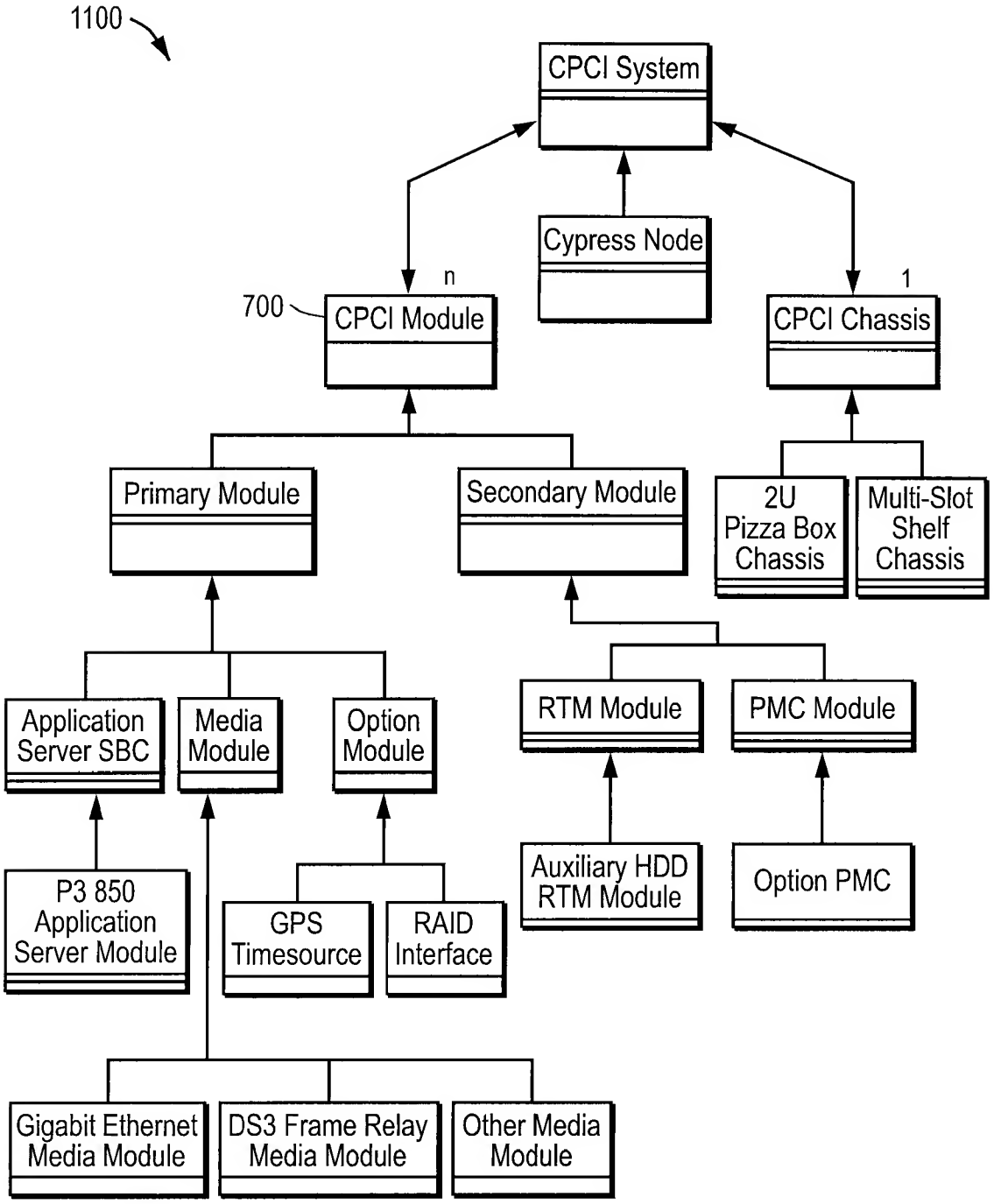
1100
CPCI System
Cypress Node
n
700
CPCI Module
1
CPCI Chassis
Primary Module
Secondary Module
2U Pizza Box Chassis
Multi-Slot Shelf Chassis
Application Server SBC
Media Module
Option Module
RTM Module
PMC Module
P3 850 Application Server Module
GPS Timesource
RAID Interface
Auxiliary HDD RTM Module
Option PMC
Gigabit Ethernet Media Module
DS3 Frame Relay Media Module
Other Media Module

FIG. 11

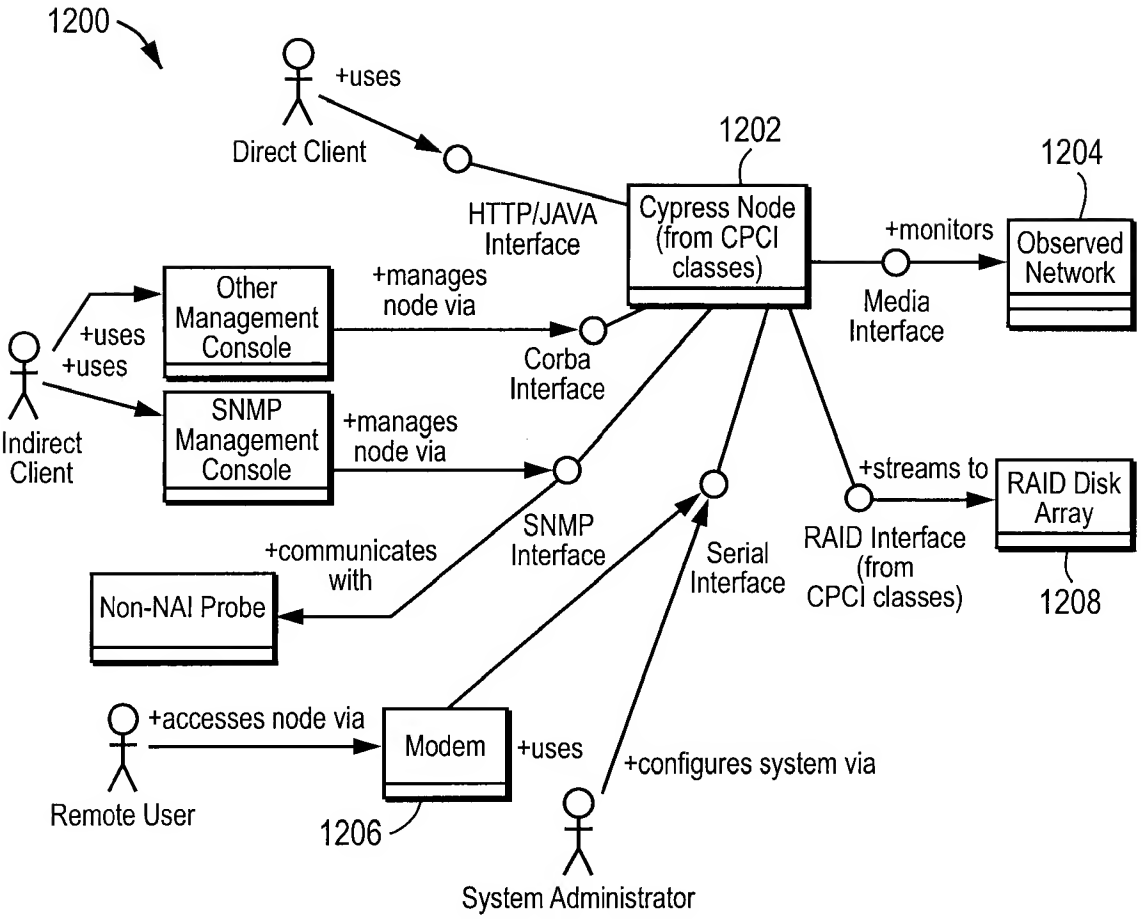

FIG. 12

1300

User Class	Operations Allowed
Network Administrators	System turn-up & configuration, add users, etc.
Business Users (CIO)	View reports, trends, accounting info, etc.
Security Managers	Access users e-mail, web activity, policies, etc.
Network Planners	Access to capacity, trend, load & distribution info.
Network Managers	General access to all but security related
Network Technicians	Access to diagnostics, alarms, trace files, etc.

FIG. 13

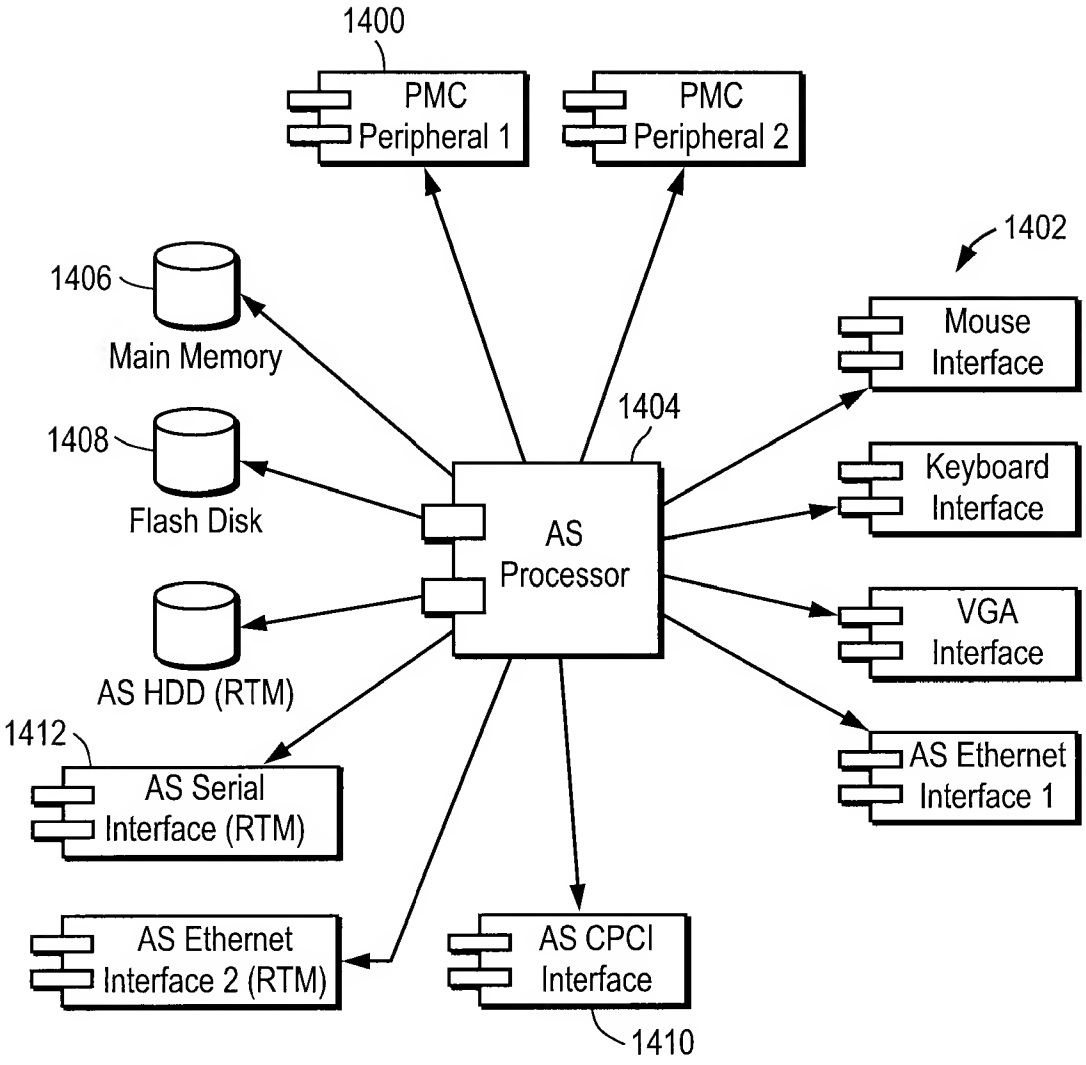
1400
PMC Peripheral 1
PMC Peripheral 2
1402
1406
Main Memory
Mouse Interface
1404
1408
Flash Disk
Keyboard Interface
AS Processor
VGA Interface
AS HDD (RTM)
1412
AS Ethernet Interface 1
AS Serial Interface (RTM)
AS Ethernet Interface 2 (RTM)
AS CPCI Interface
1410

FIG. 14

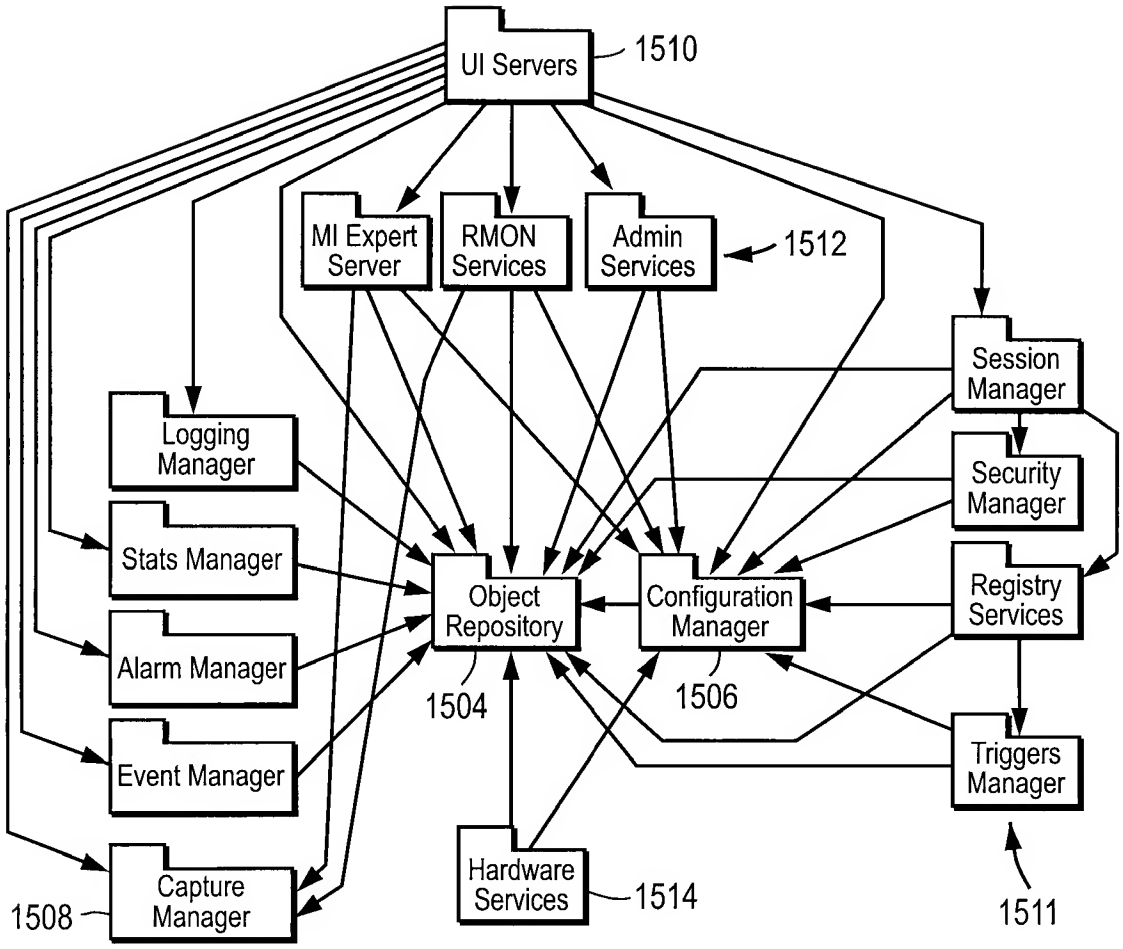
UI Servers
1510
MI Expert Server
RMON Services
Admin Services
1512
Session Manager
Logging Manager
Security Manager
Stats Manager
Object Repository
Configuration Manager
Registry Services
Alarm Manager
1504
1506
Event Manager
Triggers Manager
Hardware Services
1514
Capture Manager
1508
1511

FIG. 15

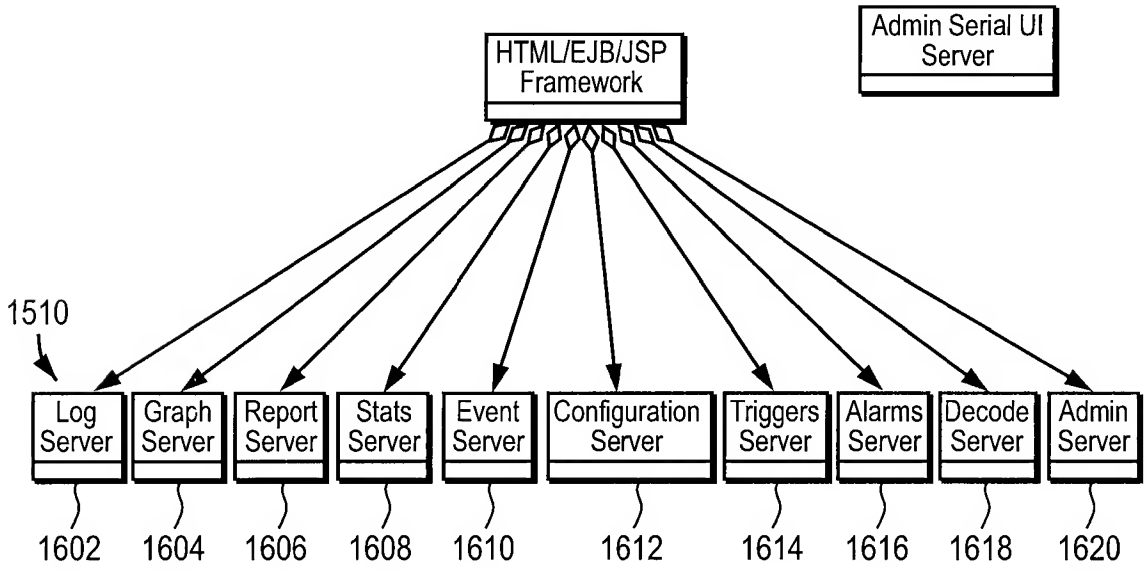
HTML/EJB/JSP Framework
Admin Serial UI Server
1510
Log Server
Graph Server
Report Server
Stats Server
Event Server
Configuration Server
Triggers Server
Alarms Server
Decode Server
Admin Server
1602
1604
1606
1608
1610
1612
1614
1616
1618
1620

FIG. 16

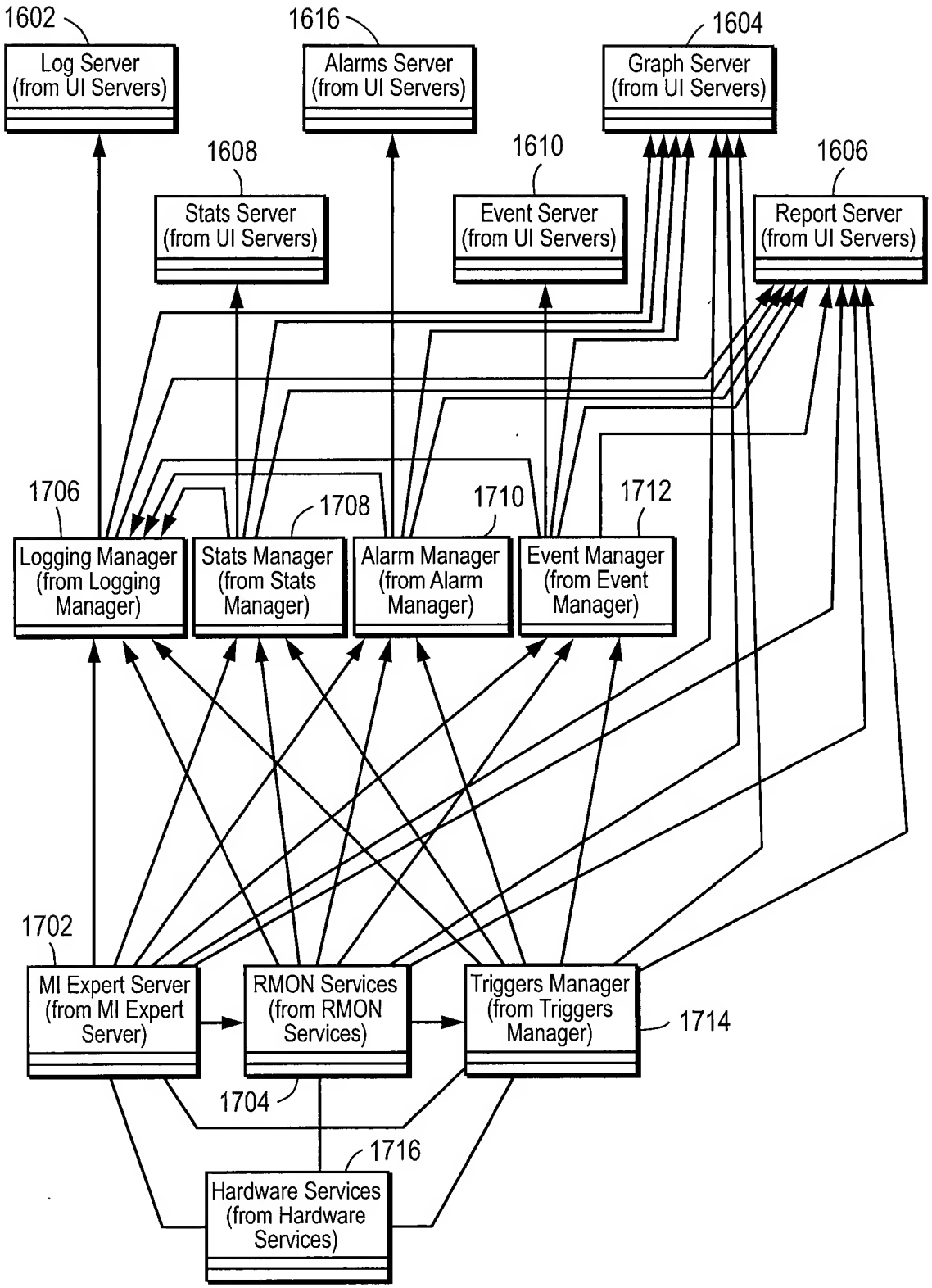
1602
Log Server (from UI Servers)
1616
Alarms Server (from UI Servers)
1604
Graph Server (from UI Servers)
1608
Stats Server (from UI Servers)
1610
Event Server (from UI Servers)
1606
Report Server (from UI Servers)
1706
1708
1710
1712
Logging Manager (from Logging Manager)
Stats Manager (from Stats Manager)
Alarm Manager (from Alarm Manager)
Event Manager (from Event Manager)
1702
MI Expert Server (from MI Expert Server)
RMON Services (from RMON Services)
Triggers Manager (from Triggers Manager)
1714
1704
1716
Hardware Services (from Hardware Services)

FIG. 17

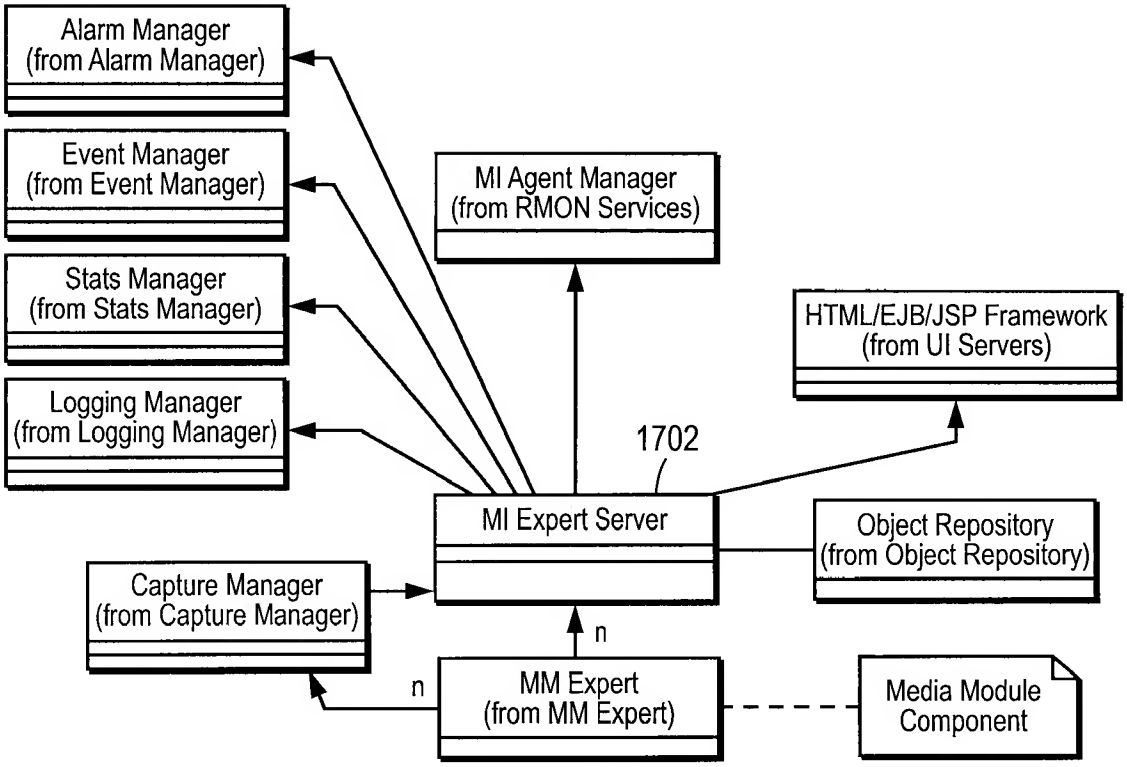
Alarm Manager
(from Alarm Manager)
Event Manager
(from Event Manager)
Stats Manager
(from Stats Manager)
Logging Manager
(from Logging Manager)
MI Agent Manager
(from RMON Services)
HTML/EJB/JSP Framework
(from UI Servers)
1702
MI Expert Server
Object Repository
(from Object Repository)
Capture Manager
(from Capture Manager)
n
n
MM Expert
(from MM Expert)
Media Module
Component

FIG. 18

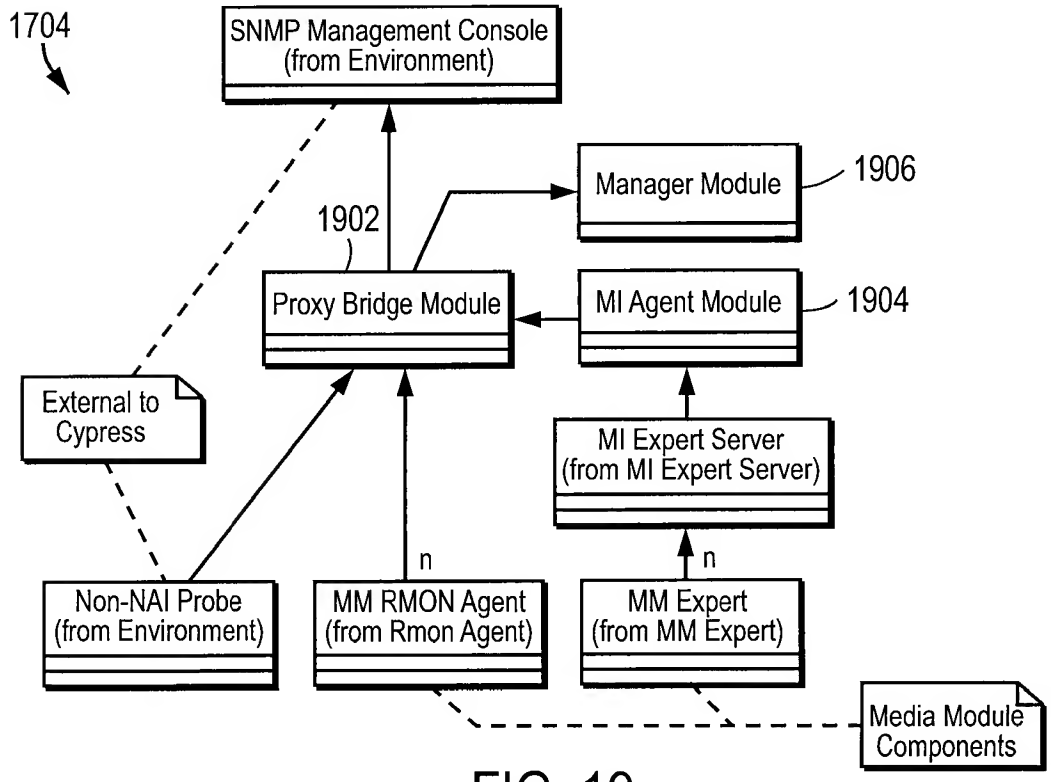
1704
SNMP Management Console
(from Environment)
Manager Module
1906
1902
Proxy Bridge Module
MI Agent Module
1904
External to
Cypress
MI Expert Server
(from MI Expert Server)
n
n
Non-NAI Probe
(from Environment)
MM RMON Agent
(from Rmon Agent)
MM Expert
(from MM Expert)
Media Module
Components

FIG. 19

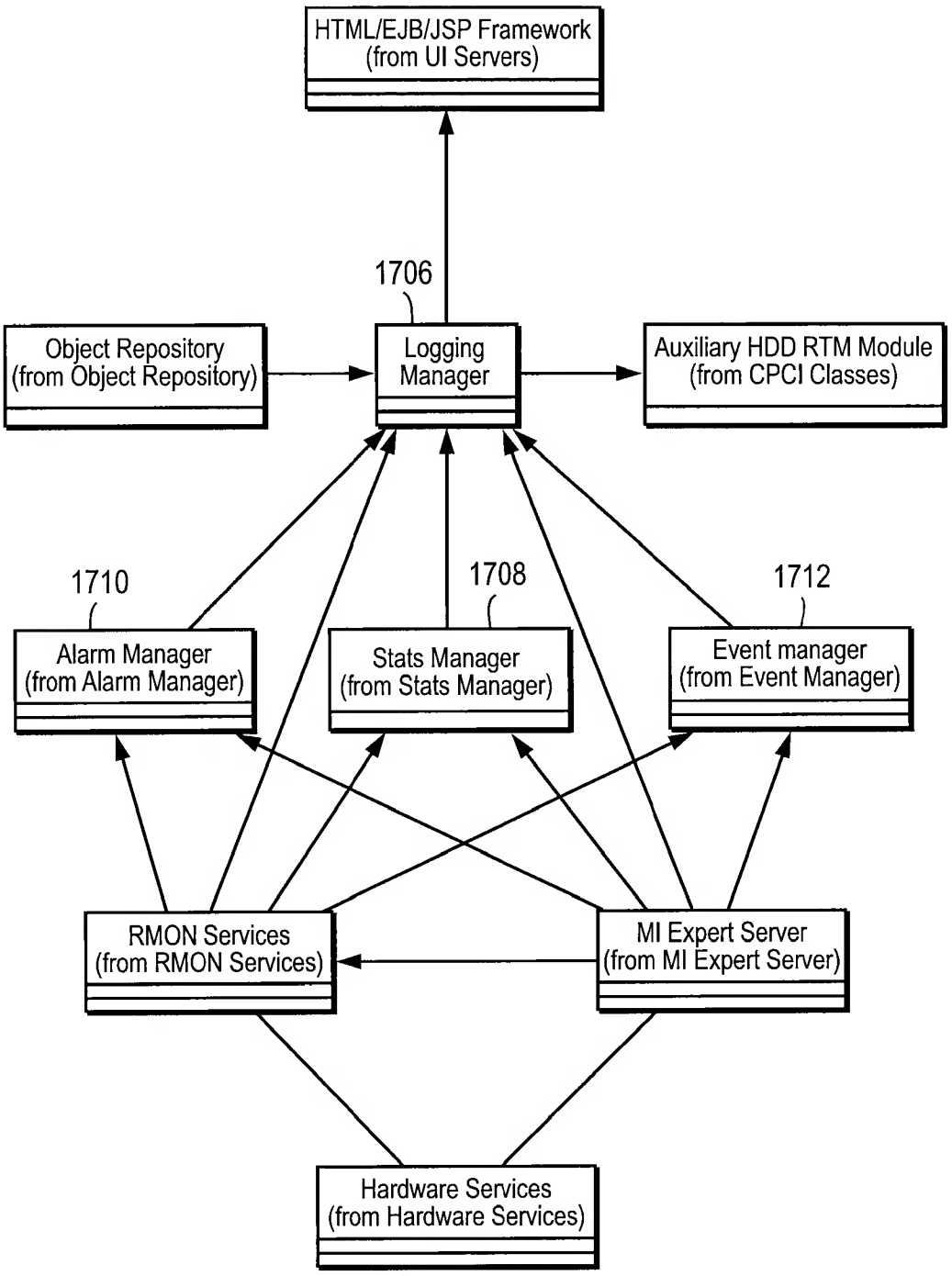
HTML/EJB/JSP Framework
(from UI Servers)
1706
Object Repository
(from Object Repository)
Logging
Manager
Auxiliary HDD RTM Module
(from CPCI Classes)
1710
1708
1712
Alarm Manager
(from Alarm Manager)
Stats Manager
(from Stats Manager)
Event manager
(from Event Manager)
RMON Services
(from RMON Services)
MI Expert Server
(from MI Expert Server)
Hardware Services
(from Hardware Services)

FIG. 20

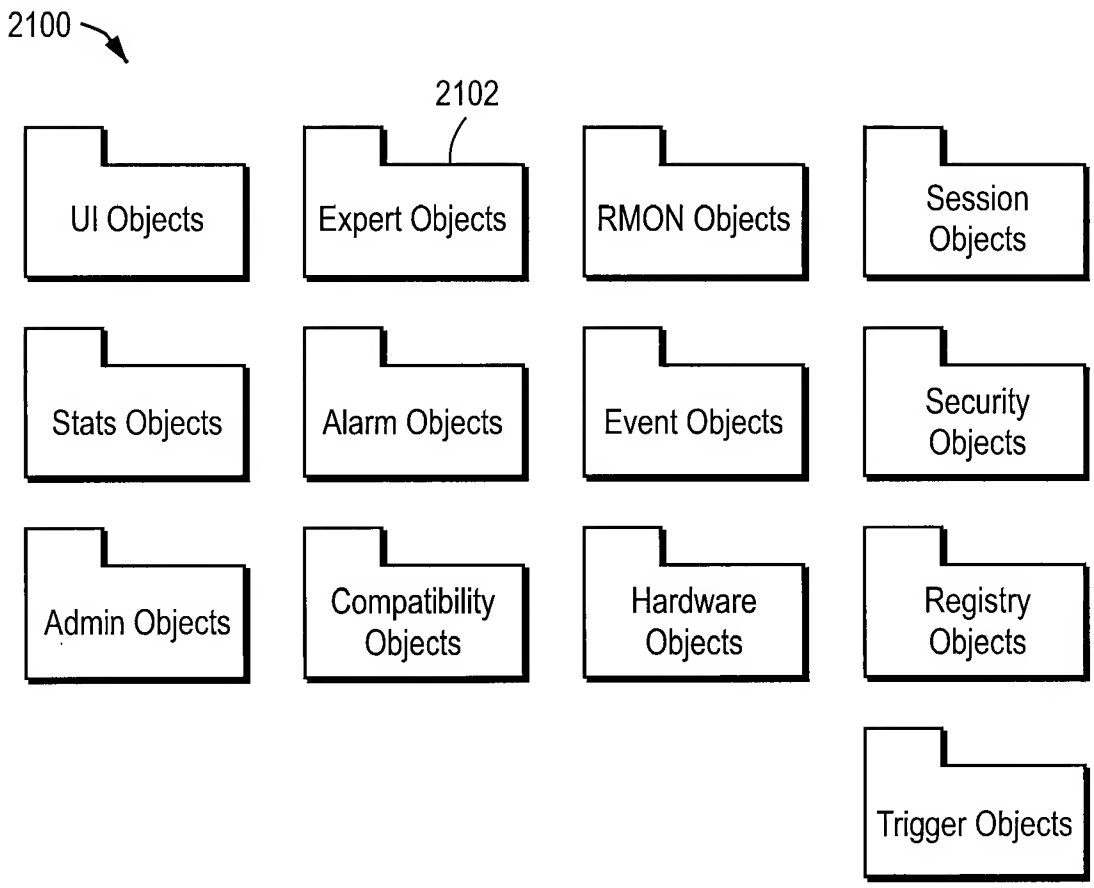
2100
2102
UI Objects
Expert Objects
RMON Objects
Session Objects
Stats Objects
Alarm Objects
Event Objects
Security Objects
Admin Objects
Compatibility Objects
Hardware Objects
Registry Objects
Trigger Objects

FIG. 21

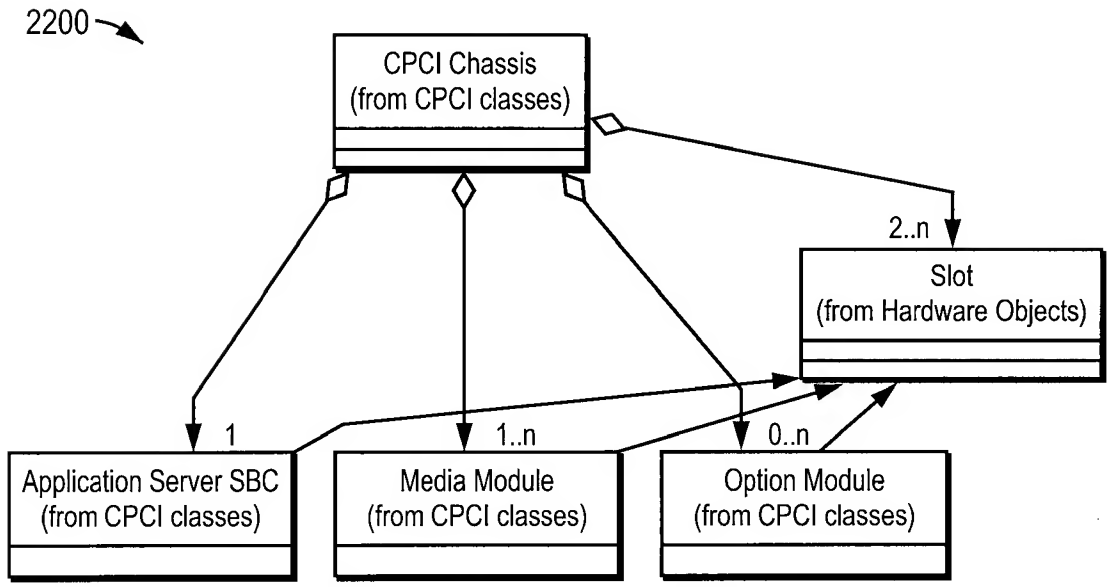

FIG. 22A

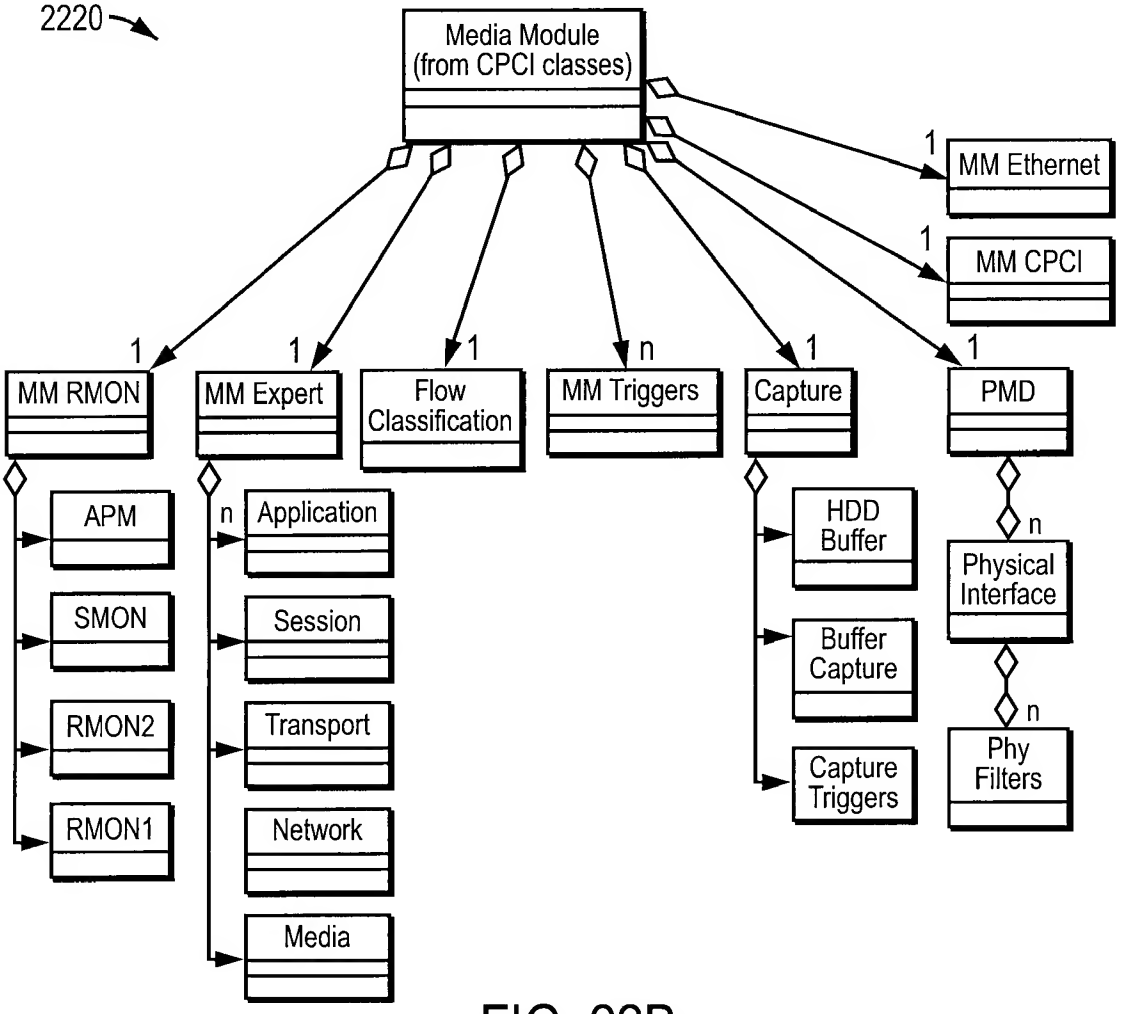

FIG. 22B

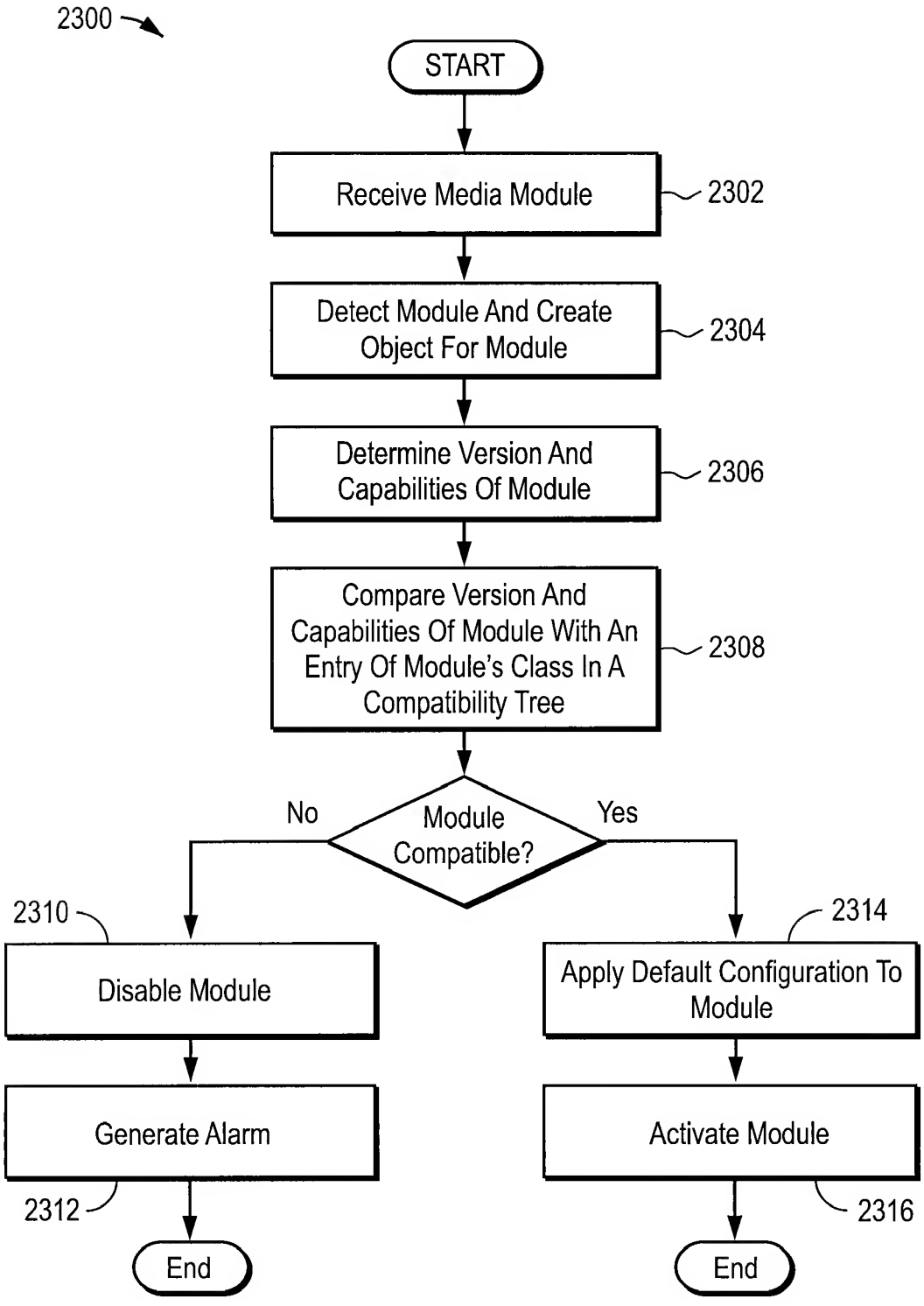
2300
START
Receive Media Module
2302
Detect Module And Create Object For Module
2304
Determine Version And Capabilities Of Module
2306
Compare Version And Capabilities Of Module With An Entry Of Module's Class In A Compatibility Tree
2308
Module Compatible?
No
Yes
2310
Disable Module
Generate Alarm
2312
End
2314
Apply Default Configuration To Module
Activate Module
2316
End

FIG. 23

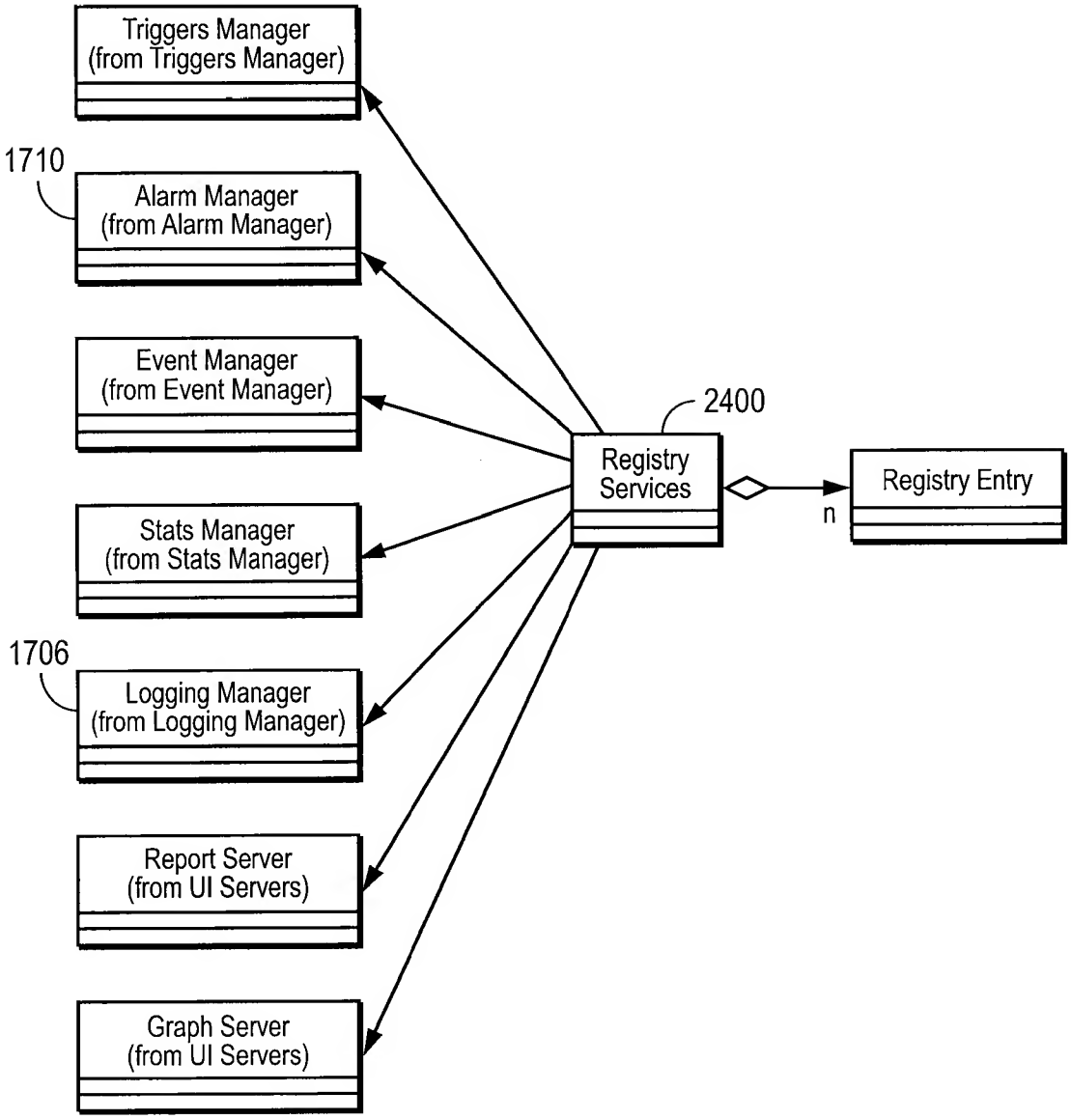
Triggers Manager
(from Triggers Manager)
1710
Alarm Manager
(from Alarm Manager)
Event Manager
(from Event Manager)
2400
Registry
Services
Registry Entry
n
Stats Manager
(from Stats Manager)
1706
Logging Manager
(from Logging Manager)
Report Server
(from UI Servers)
Graph Server
(from UI Servers)

FIG. 24

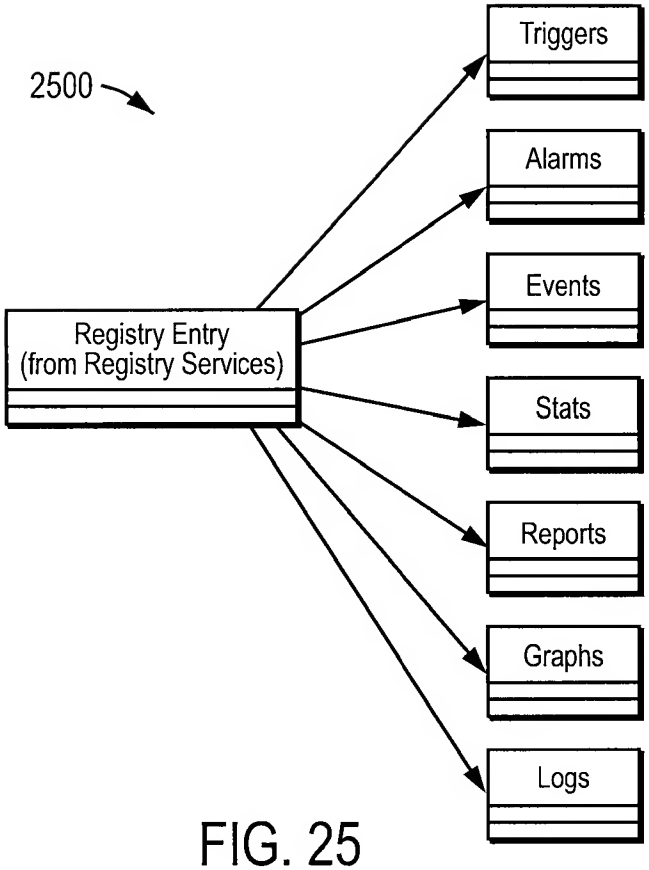

FIG. 25

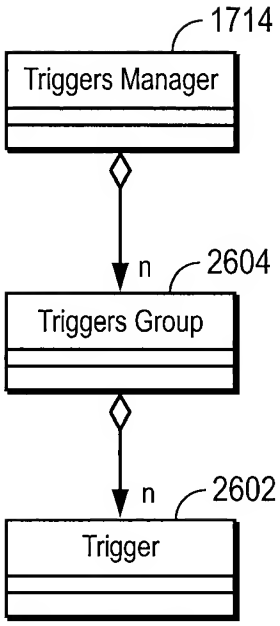

FIG. 26

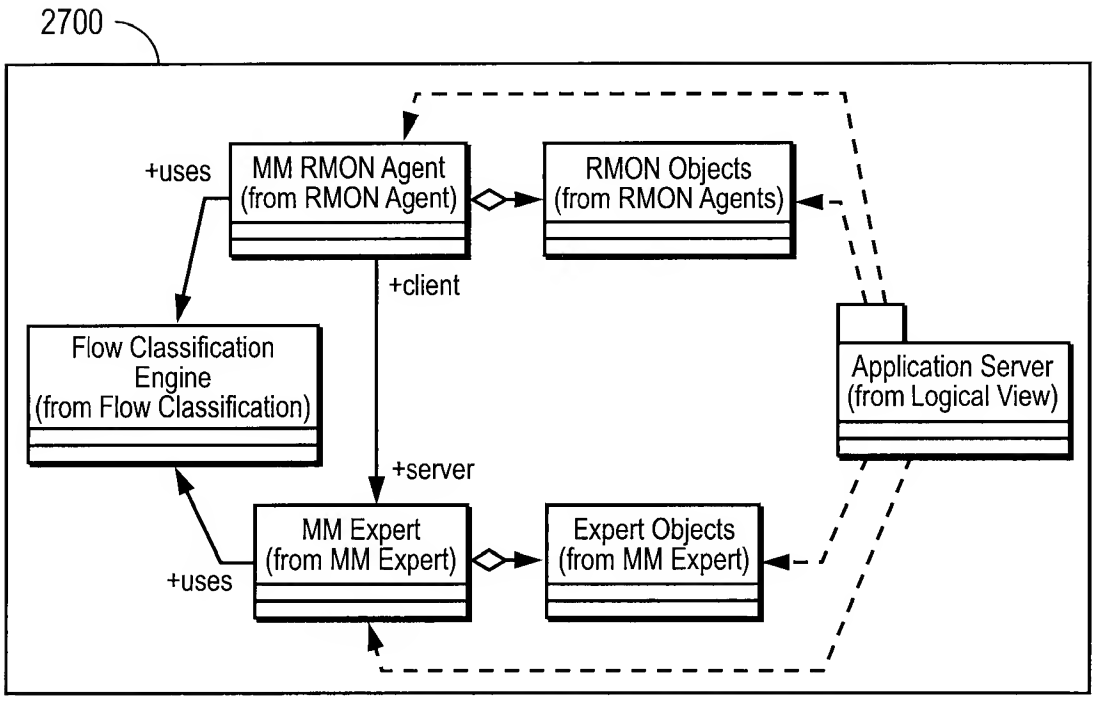

FIG. 27

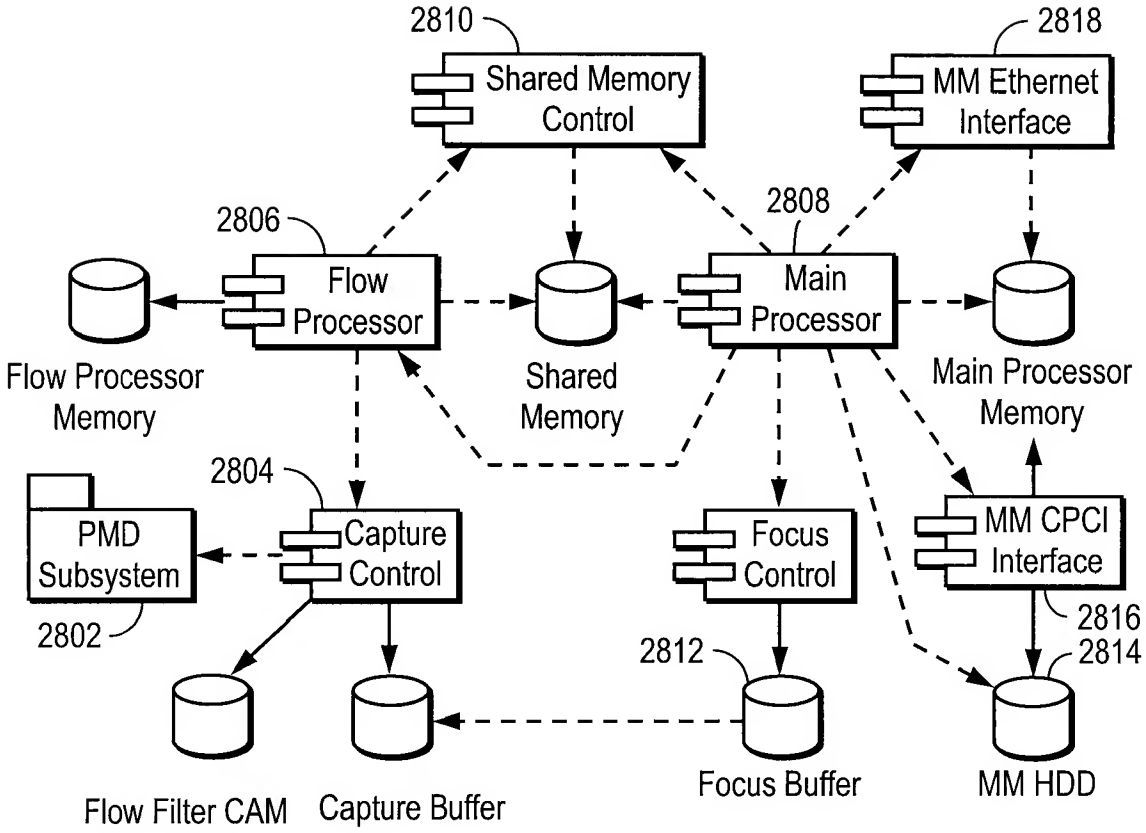
2810
Shared Memory Control
2818
MM Ethernet Interface
2806
2808
Flow Processor
Main Processor
Flow Processor Memory
Shared Memory
Main Processor Memory
2804
PMD Subsystem
Capture Control
Focus Control
MM CPCI Interface
2802
2816
2814
2812
Flow Filter CAM
Capture Buffer
Focus Buffer
MM HDD

FIG. 28

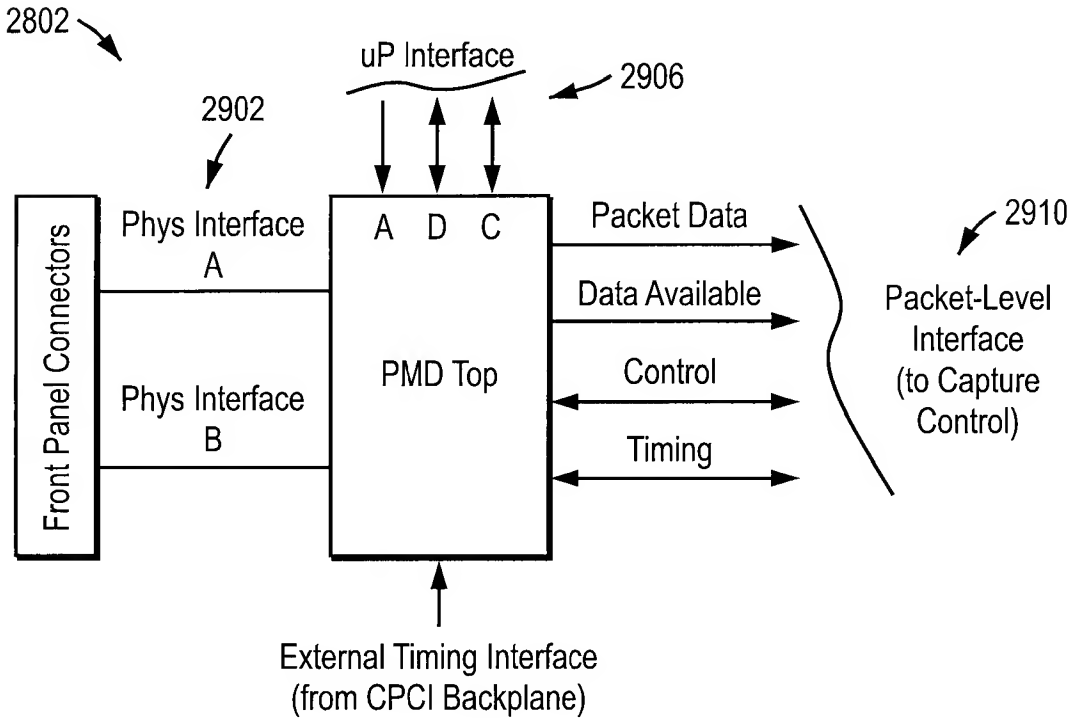
2802
uP Interface
2906
2902
Phys Interface A
A D C
Packet Data
2910
Front Panel Connectors
Data Available
Packet-Level Interface (to Capture Control)
PMD Top
Control
Phys Interface B
Timing
External Timing Interface (from CPCI Backplane)

FIG. 29

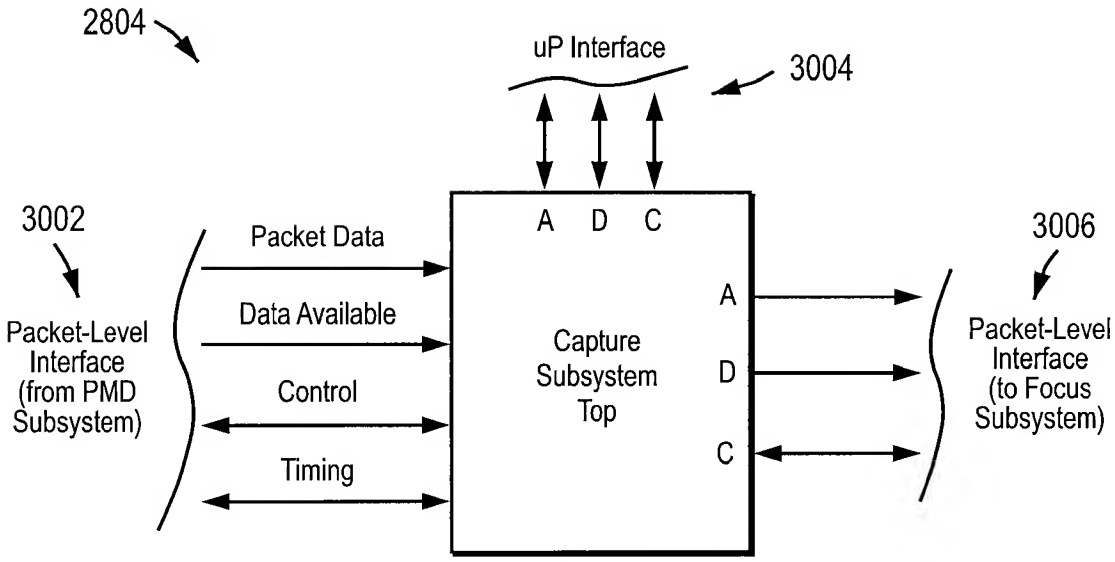
2804
uP Interface
3004
A D C
3002
Packet Data
Data Available
Control
Timing
Packet-Level Interface (from PMD Subsystem)
Capture Subsystem Top
A
D
C
3006
Packet-Level Interface (to Focus Subsystem)

FIG. 30

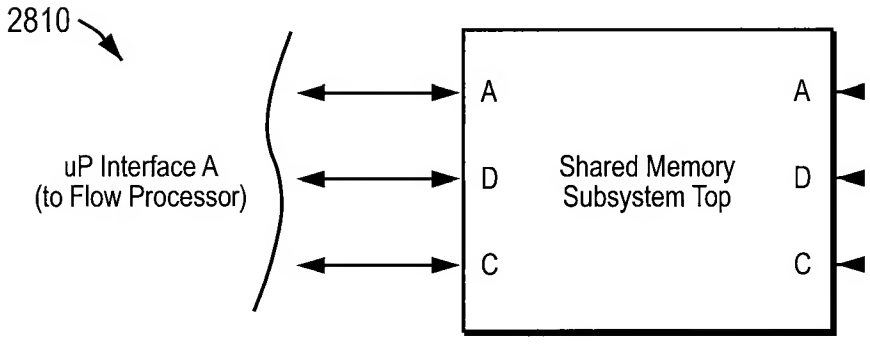
2810
uP Interface A (to Flow Processor)
A
D
C
Shared Memory Subsystem Top
A
D
C

FIG. 31

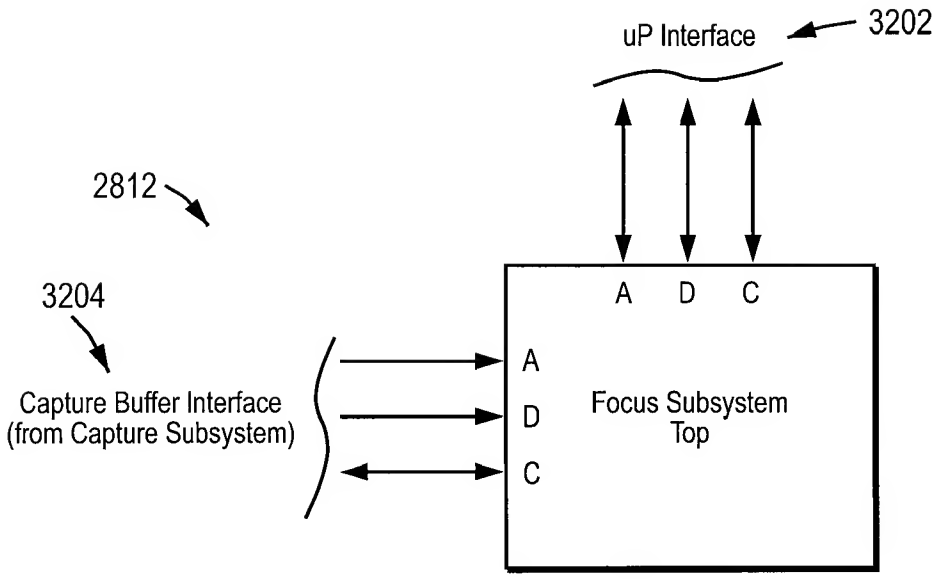
uP Interface
3202
2812
3204
A
D
C
Capture Buffer Interface
(from Capture Subsystem)
A
D
C
Focus Subsystem
Top

FIG. 32

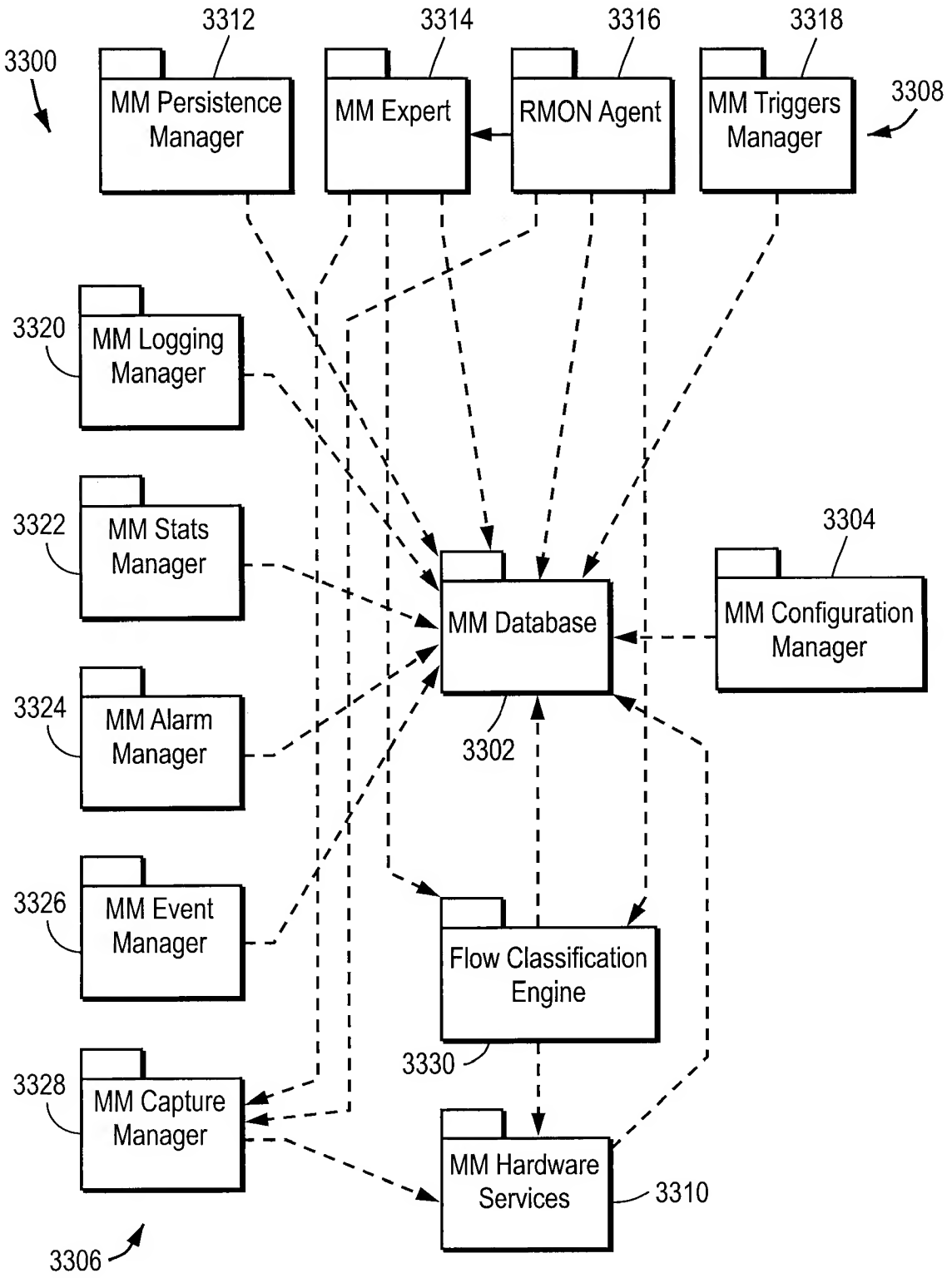
3300
3312
MM Persistence Manager
3314
MM Expert
3316
RMON Agent
3318
MM Triggers Manager
3308
3320
MM Logging Manager
3322
MM Stats Manager
3324
MM Alarm Manager
3326
MM Event Manager
3328
MM Capture Manager
3306
MM Database
3302
3304
MM Configuration Manager
Flow Classification Engine
3330
MM Hardware Services
3310

FIG. 33

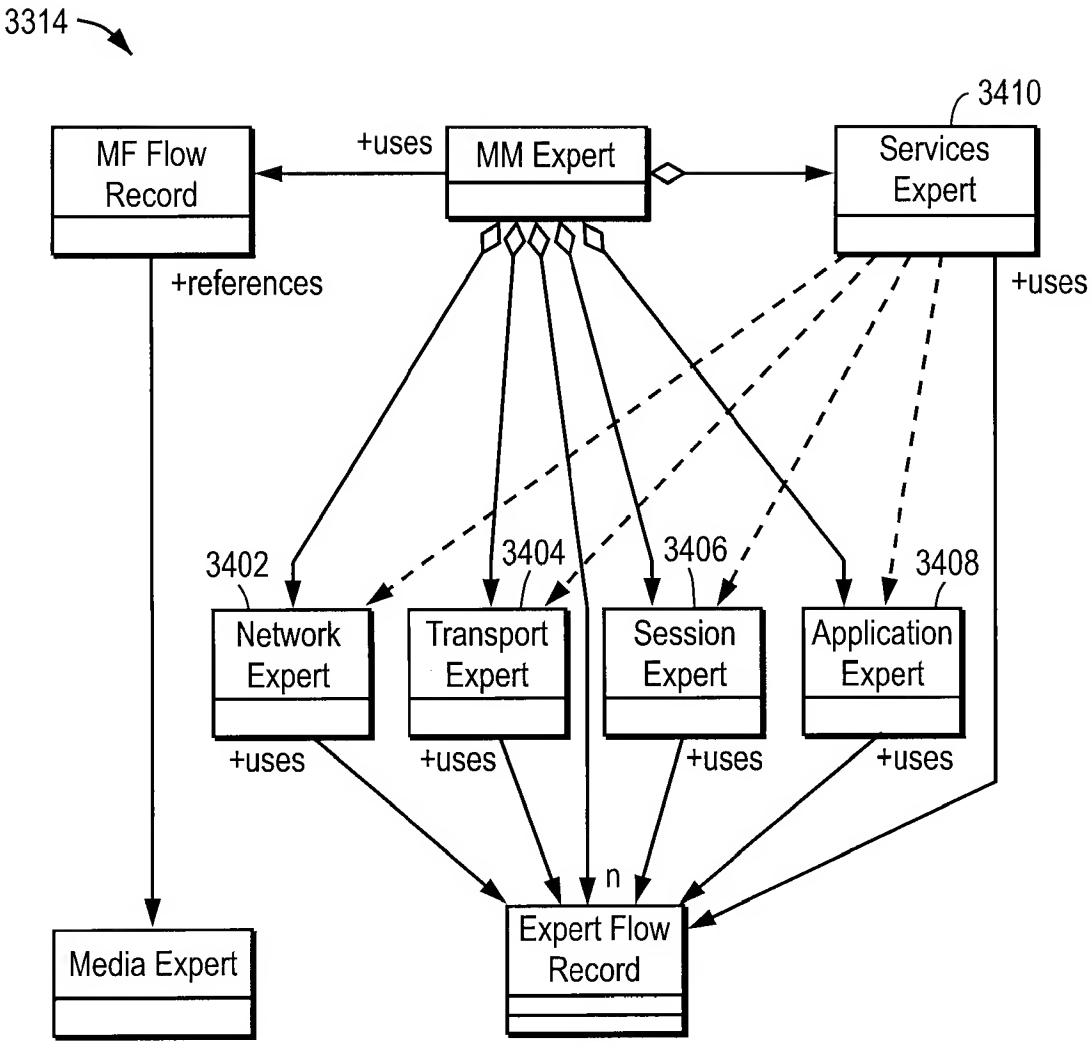
3314
3410
MF Flow Record
+uses
MM Expert
Services Expert
+references
+uses
3402
3404
3406
3408
Network Expert
Transport Expert
Session Expert
Application Expert
+uses
+uses
+uses
+uses
n
Media Expert
Expert Flow Record

FIG. 34

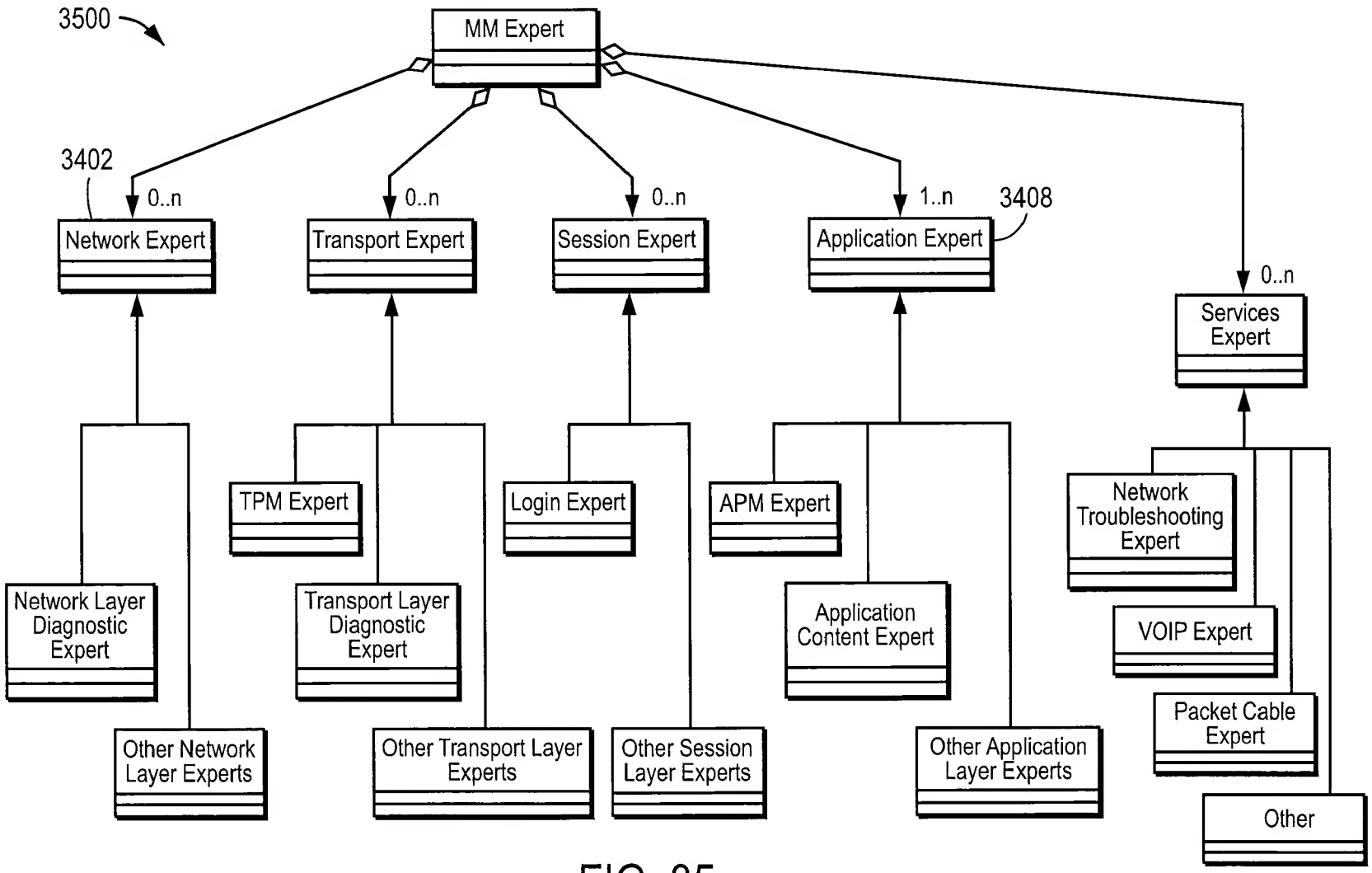
3500
MM Expert
3402
0..n
0..n
0..n
1..n
3408
Network Expert
Transport Expert
Session Expert
Application Expert
0..n
Services Expert
TPM Expert
Login Expert
APM Expert
Network Troubleshooting Expert
Network Layer Diagnostic Expert
Transport Layer Diagnostic Expert
Application Content Expert
VOIP Expert
Packet Cable Expert
Other Network Layer Experts
Other Transport Layer Experts
Other Session Layer Experts
Other Application Layer Experts
Other

FIG. 35

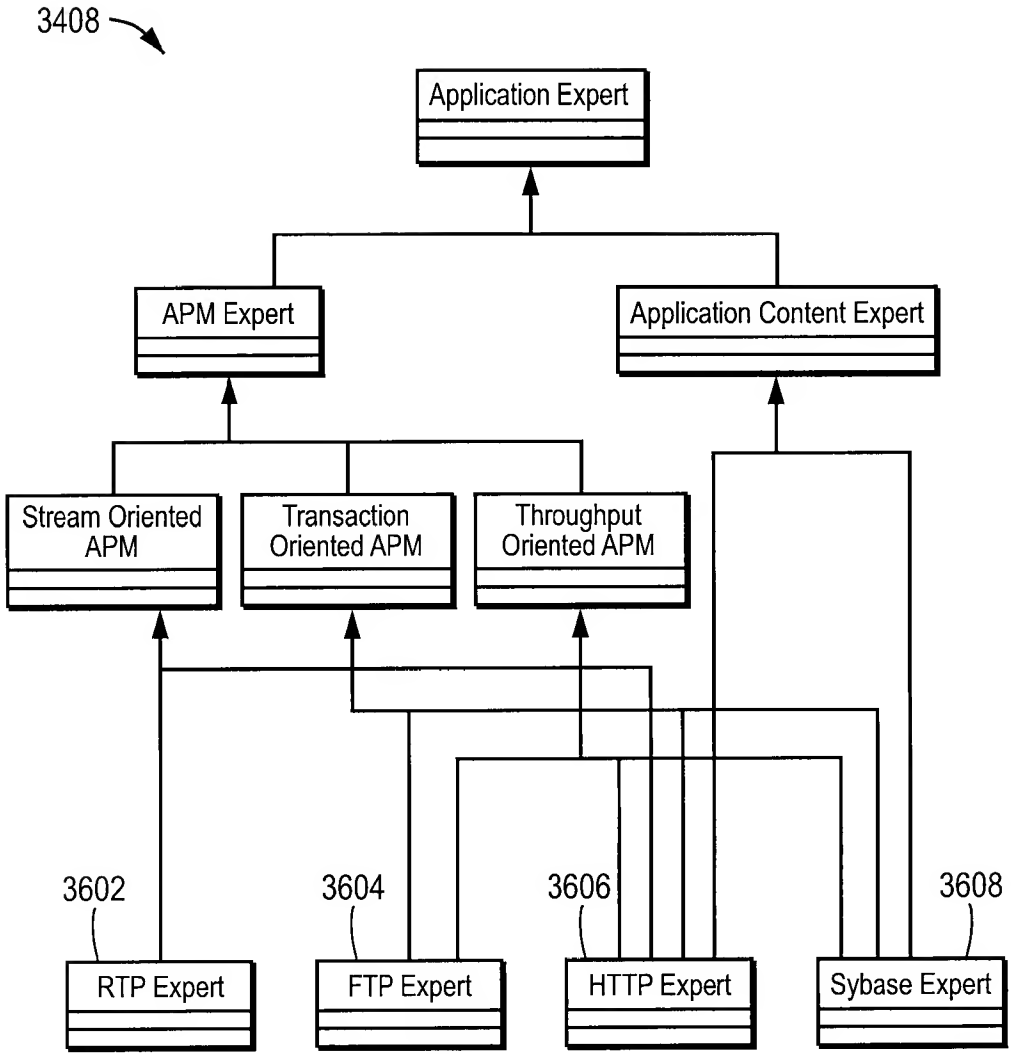
3408
Application Expert
APM Expert
Application Content Expert
Stream Oriented APM
Transaction Oriented APM
Throughput Oriented APM
3602
3604
3606
3608
RTP Expert
FTP Expert
HTTP Expert
Sybase Expert

FIG. 36

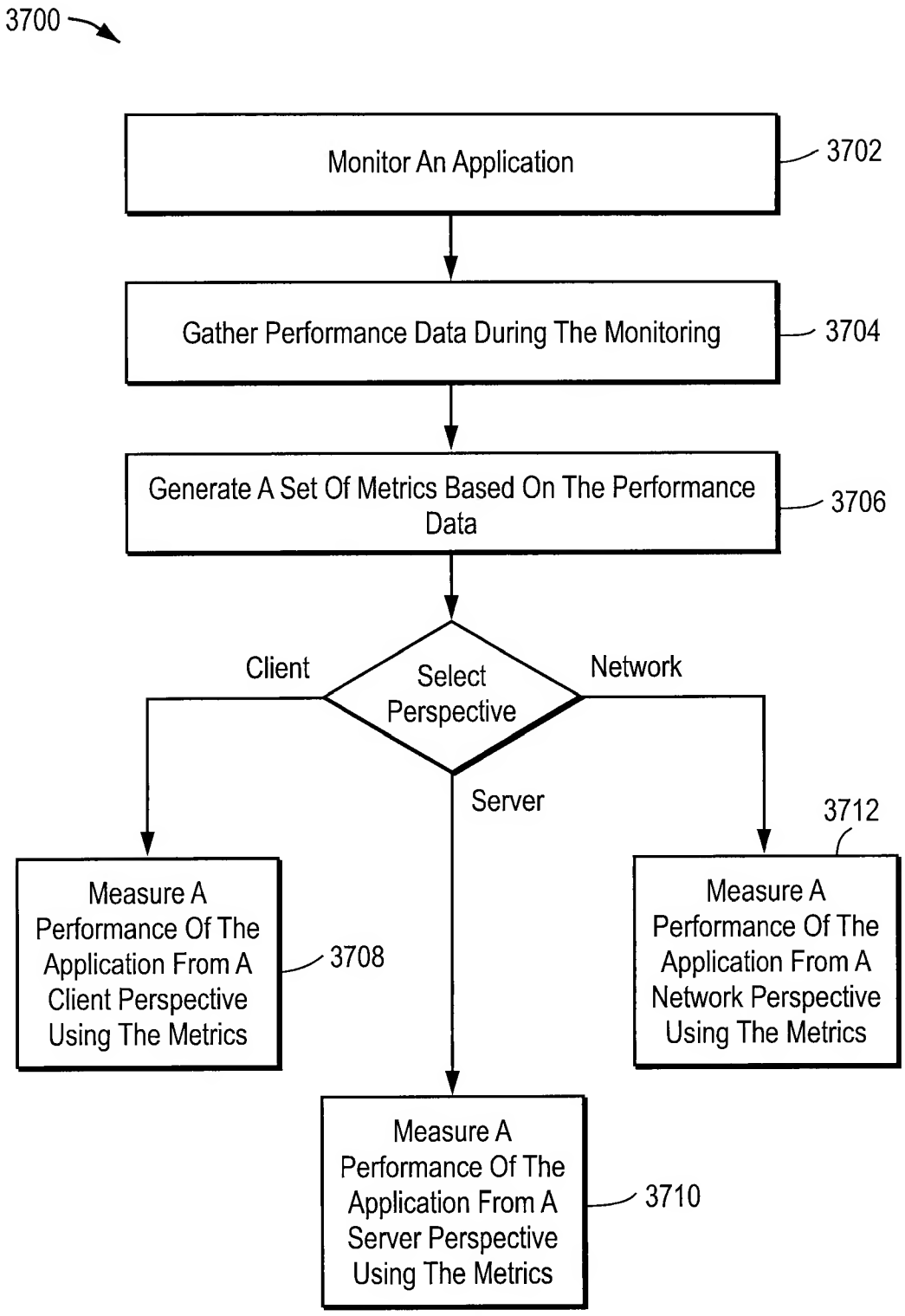
3700
Monitor An Application
3702
Gather Performance Data During The Monitoring
3704
Generate A Set Of Metrics Based On The Performance Data
3706
Select Perspective
Client
Server
Network
Measure A Performance Of The Application From A Client Perspective Using The Metrics
3708
Measure A Performance Of The Application From A Server Perspective Using The Metrics
3710
Measure A Performance Of The Application From A Network Perspective Using The Metrics
3712

FIG. 37

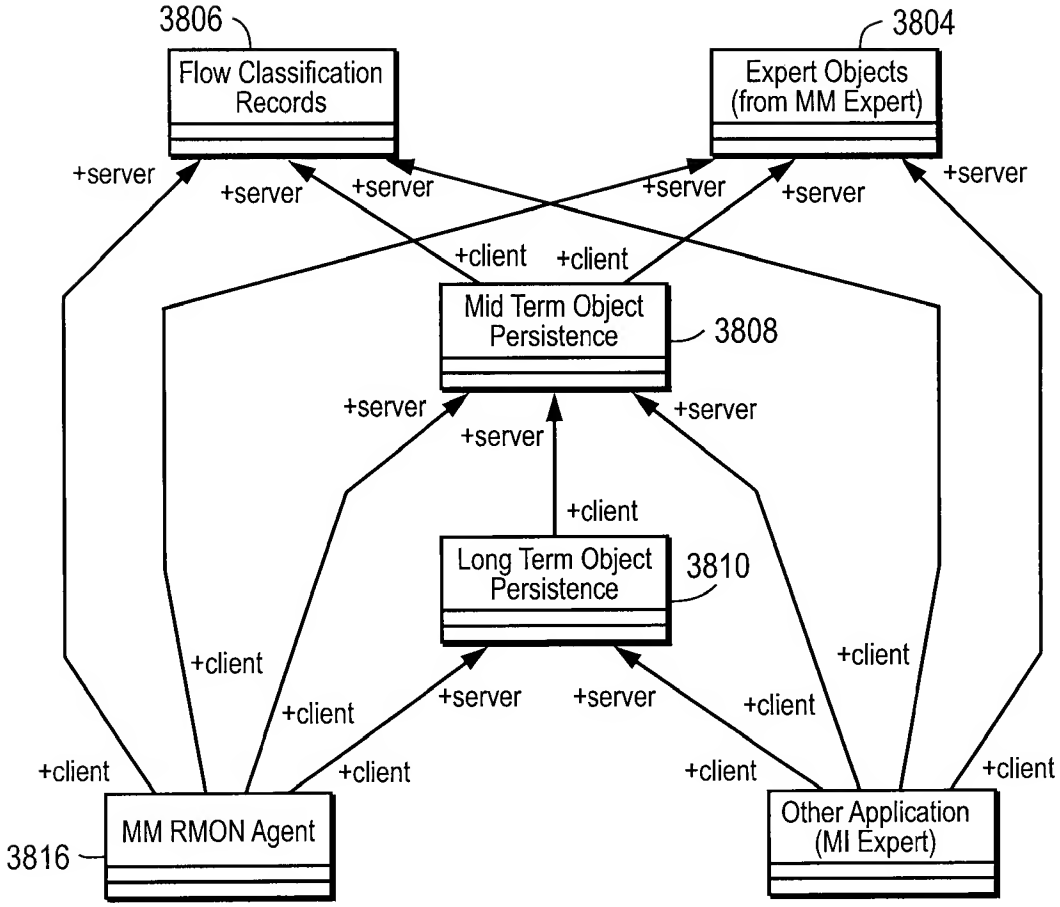
3806
Flow Classification Records
3804
Expert Objects (from MM Expert)
+server
+client
Mid Term Object Persistence
3808
Long Term Object Persistence
3810
MM RMON Agent
3816
Other Application (MI Expert)

FIG. 38

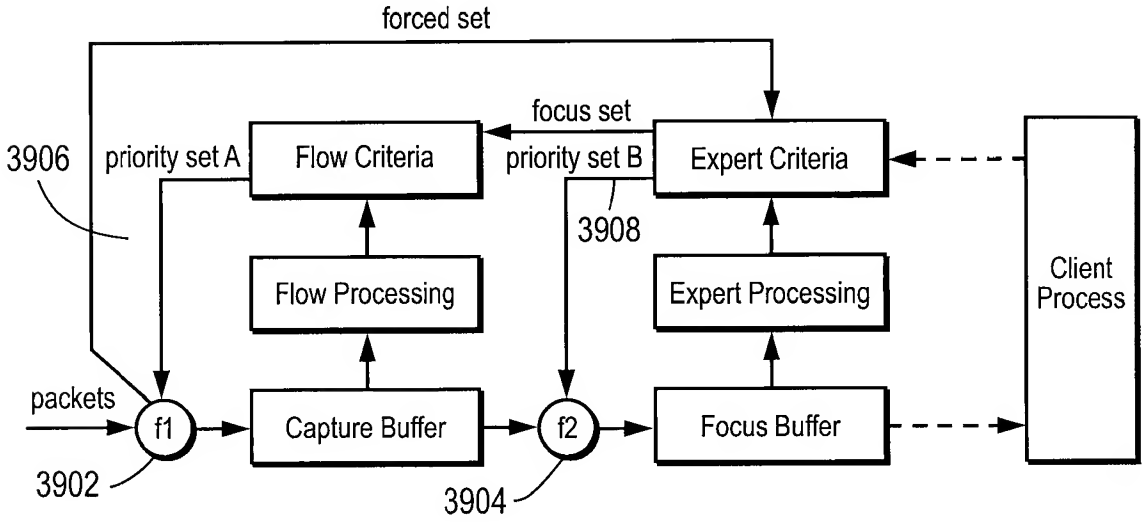
forced set
focus set
3906
priority set A
Flow Criteria
priority set B
Expert Criteria
3908
Flow Processing
Expert Processing
Client Process
packets
f1
Capture Buffer
f2
Focus Buffer
3902
3904

FIG. 39

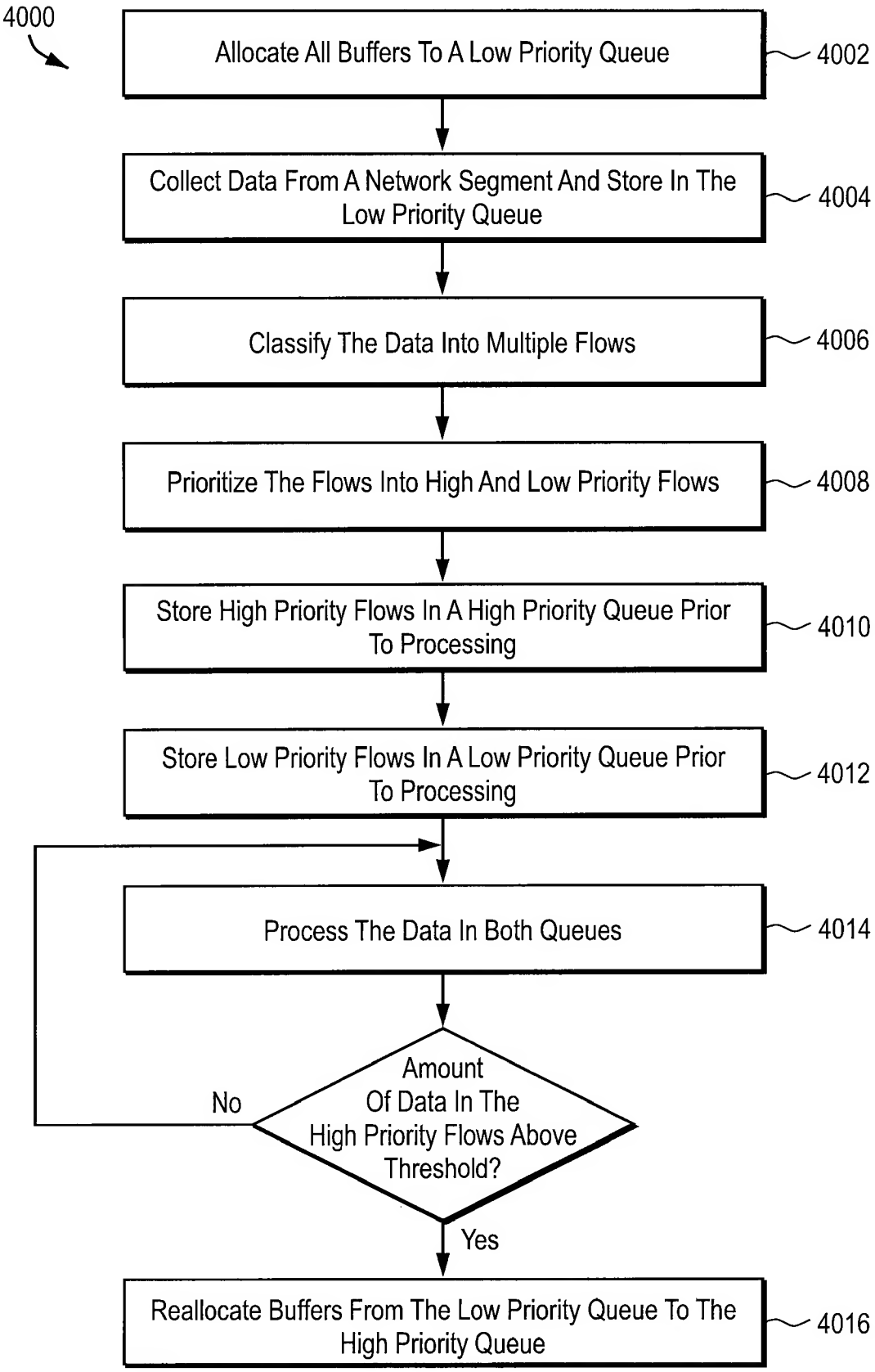
4000
Allocate All Buffers To A Low Priority Queue
4002
Collect Data From A Network Segment And Store In The Low Priority Queue
4004
Classify The Data Into Multiple Flows
4006
Prioritize The Flows Into High And Low Priority Flows
4008
Store High Priority Flows In A High Priority Queue Prior To Processing
4010
Store Low Priority Flows In A Low Priority Queue Prior To Processing
4012
Process The Data In Both Queues
4014
Amount Of Data In The High Priority Flows Above Threshold?
No
Yes
Reallocate Buffers From The Low Priority Queue To The High Priority Queue
4016

FIG. 40

LEGEND

1) Packet transferred to capture control
2) Address compared in CAM
3) If entry match: priority queue, else: normal queue
4) Notify flow process of entry
5) Flow proc retrieves pkt & classifies
6) Flow record updated in shared mem, expert include flag checked
7) If headroom, add addr to priority CAM
8) If expert include flag set in flow record, initiate DMA to focus buffer
9) Write parse descriptor to shared mem
10) Expert retrieves parse descriptor
11) Expert retrieves flow record
12) Expert retrieves packet from focus buf
13) Expert builds/updates object(s)
14) Expert sets include flaf in flow record (if interesting)
15) Object is persisted, packet is prepended and persis
16) Event/object descriptor built for app svr (optional)
17) Descriptor retrieved by app svr (optional)
18) Objects or packet are retrieved by app svr (optional)

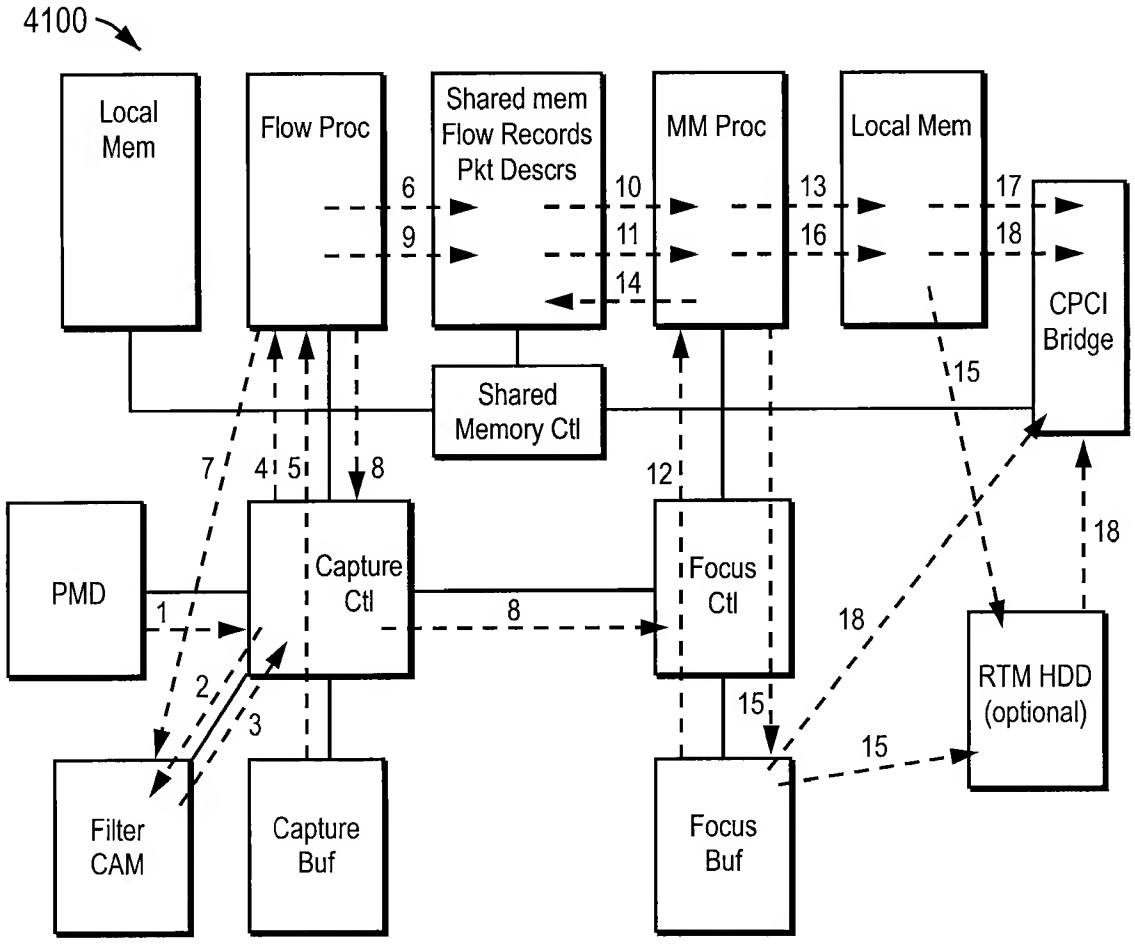

FIG. 41

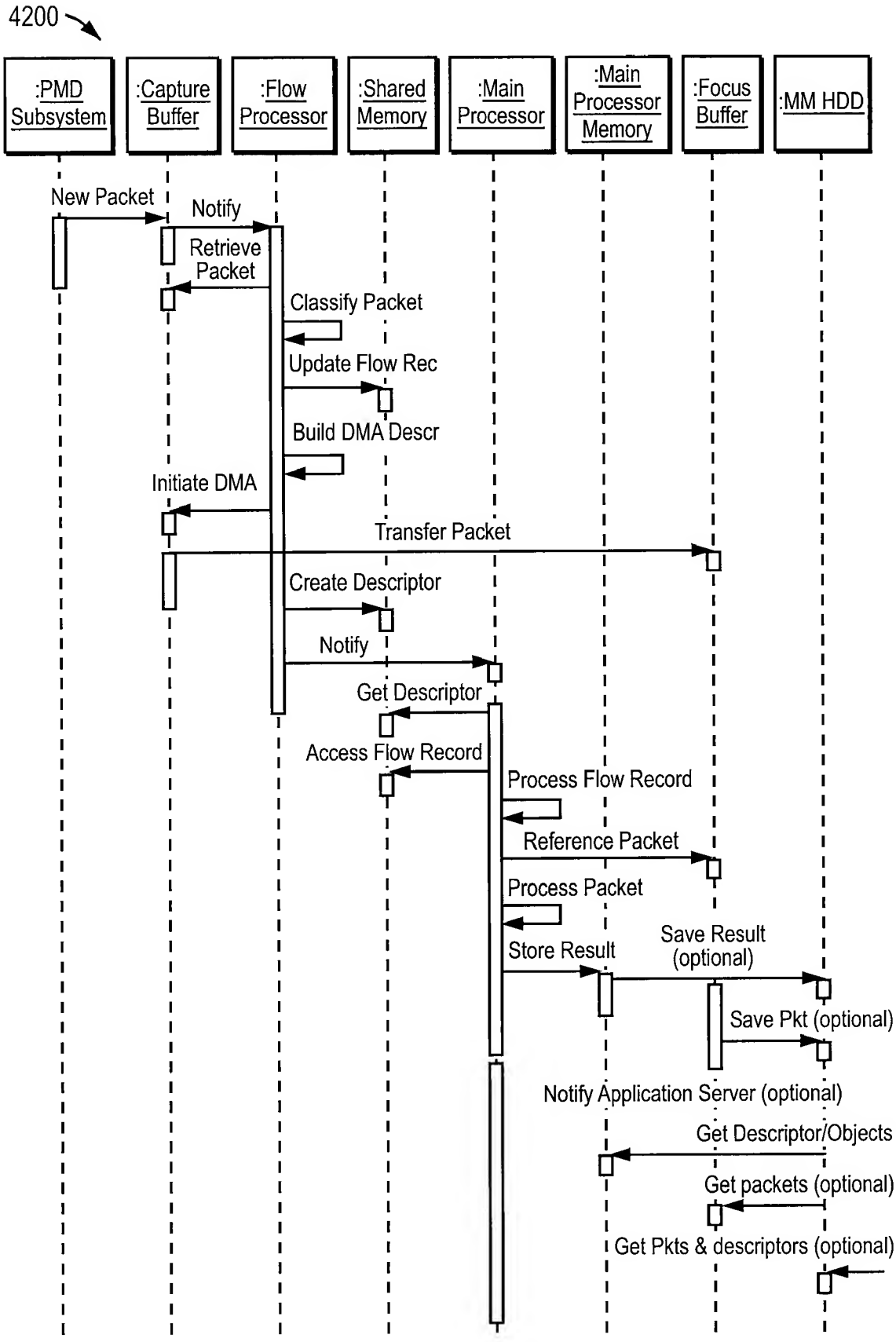
4200
:PMD Subsystem
:Capture Buffer
:Flow Processor
:Shared Memory
:Main Processor
:Main Processor Memory
:Focus Buffer
:MM HDD
New Packet
Notify
Retrieve Packet
Classify Packet
Update Flow Rec
Build DMA Descr
Initiate DMA
Transfer Packet
Create Descriptor
Notify
Get Descriptor
Access Flow Record
Process Flow Record
Reference Packet
Process Packet
Store Result
Save Result (optional)
Save Pkt (optional)
Notify Application Server (optional)
Get Descriptor/Objects
Get packets (optional)
Get Pkts & descriptors (optional)

FIG. 42